DOCUMENT RESUME

ED 449 961 SE 063 752

AUTHOR	Domroese, Margret C.; Sterling, Eleanor J.
TITLE	Interpreting Biodiversity: A Manual for Environmental Educators in the Tropics.
INSTITUTION	American Museum of Natural History, New York, NY.
ISBN	ISBN-1-930465-04-1
PUB DATE	1999-00-00
NOTE	181p.; This manual is distributed in English, French, and Spanish. Supported by the Starr Foundation.
AVAILABLE FROM	American Museum of Natural History, Center for Biodiversity and Conservation, Central Park West at 79th Street, New York, NY 10024-5192.
PUB TYPE	Guides - Classroom - Teacher (052)
EDRS PRICE	MF01/PC08 Plus Postage.
DESCRIPTORS	*Biodiversity; Cognitive Style; *Conservation (Environment); Data Collection; Environmental Education; Exhibits; *Outreach Programs; *Program Development; Program Evaluation
IDENTIFIERS	Presentations

ABSTRACT

This manual was developed for educators and natural resource managers who are establishing interpretive programs where biodiversity is the richest and most threatened. The manual contains five units which are based on the experiences of staff at the American Museum of Natural History and represent the key steps of designing an interpretation program. Units include: (1) Program Development, which describes how to develop interpretive programs to encourage biodiversity conservation; (2) Interpretive Exhibits, which displays graphics or objects assembled to convey a message to viewers; (3) Interpretive Presentations, which covers presentations offered by interpretive centers such as activities or guided tours; (4) Community Outreach, which encourages environmental facilitators to "reach out" beyond the walls of an interpretive center; and (5) Evaluation Process, which discusses evaluating the interpretive program. Key terms are listed at the back of the manual. (YDS)

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Interpreting Biodiversity

A Manual for Environmental Educators in the Tropics

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Margret C. Domroese
Eleanor J. Sterling

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A Manual for Environmental Educators in the Tropics

Margret C. Domroese
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3

American Museum of Natural History
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This manual is distributed in English, French and Spanish by:
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Preparation of this manual was made possible with the generous support of The Starr Fund for Biodiversity and Conservation, established by The Starr Foundation, and by other generous foundations, corporations, and individuals.

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ISBN 1-930465-04-1

Design by pinx., Wiesbaden, Germany
Illustrations by Christian Mentzel, Wiesbaden, Germany
Printed on 100% recycled paper (inside pages, 100% post-consumer fiber; covers, 50% post-consumer fiber)

Acknowledgments

We gratefully acknowledge the contributions of Elisabeth Winterwerb-Cossons from the early stages of this project through its completion.

We thank: Larry Langham for lending his expertise in exhibit planning and design; Maritza Macdonald, Amy O'Donnell, and Ann Prewitt for their contributions on the theory and practice of teaching and learning; Lisa Kronthal for information about exhibition materials; Penelope Bodry-Sanders for ideas on training tour guides; Liz Johnson for her thorough review of drafts; Margaret Law for handling administrative matters; and Francesca Grifo for her support of this project.

Many of our colleagues reviewed drafts and made insightful comments based on their experiences. We wish to mention: Jennifer Burt, Lorena Calvo, Betsy Carlson, James Connor, Myrtle Flowers, Kevin Frey, Joan Haley, Susan Jacobson, Sharon Katz, Peter Maille, Alison Ormsby, Dana Porfirio, Thérèse Ratodiarisoa, John Shores, and Michael Simsik.

The work of Barbara Adams, Emily Gaenzle, Jocelyn Hubbell, Marc Lecard, Clara McAuley, Eugenia Naro, Sofia Paredes-Maury, Lori Rapaport, JoAnn Silverstein, Valeda Slade, and Mallory Stewart was invaluable at the various stages of writing and editing this manual.

We are also indebted to the many people who have written about their experiences in interpreting biodiversity and have developed useful guidelines for educators and resource managers. We have learned much from them and cited their important work in this manual.

Preface

Environmental Interpretation

Environmental interpretation can be an effective way to communicate about, and involve people in, biodiversity conservation. This manual is designed for educators and natural resource managers who are establishing interpretive programs in tropical regions, where the world's biodiversity is the richest and the most threatened.

The manual is based on the experiences of American Museum of Natural History staff, including a 1996 pilot education workshop with Peace Corps - Madagascar. With contributions from many colleagues, the manual is a synopsis of workshops and literature presented in a way that is intended to be succinct, accessible, and adaptable for a variety of situations.

The five units of the manual are devoted to the key steps in the process of designing an interpretation program – whether large or small – including principles of exhibit design, presentations at an interpretive center, community outreach activities, and the process of evaluation.

A list of resources provides additional information on the topics covered in each unit. We are developing inserts for selected tropical countries that detail important biodiversity concepts for each country, describe pressing environmental problems, and suggest appropriate activities based on available resources. We hope that interpreters of all kinds will find the manual useful in educating people to solve environmental problems.

Why Biodiversity?

The environment is made up of all of the living and non-living elements that surround, interact with, and influence us. Biological diversity, or biodiversity, refers to the variety and interdependence of living things in our environment. People depend on a healthy and biologically-diverse environment to meet their basic needs for food, water, and shelter, as well as to enrich their lives in many other ways.

In recent years, scientists have become alarmed at the rate of biodiversity loss. Many of these losses are caused by overuse or abuse of natural resources by people, and can be prevented. Whenever we consume too much or misuse our natural resources, we may contribute to a decline in the population of one or more species. When a species becomes endangered or extinct, other species that depend upon it for food, shelter, or the ability to reproduce are also threatened. This affects our own lives, as well as those of future generations.

Because biodiversity is integral to the lives of everyone and is a topic that interpretive centers are well-suited to address, we have chosen biodiversity and its conservation as the organizing theme for this manual. However, principles and techniques in this manual can also be applied in developing an interpretive program

that focuses on other types of issues, such as cultural diversity, health, sanitation, pollution, or agricultural productivity, to name a few.

Notes

Terminology

Throughout this manual we use the terms, "environment" and "biodiversity" repeatedly, but not interchangeably. Biodiversity is a subset of the environment. The environment is comprised of biotic (living) and abiotic (non-living) elements, while biodiversity includes only the biotic, or living, part of the environment. Whenever possible, we use "environment" to discuss general principles of environmental interpretation, and "biodiversity" to describe specific examples.

Text guidelines

- *References* to relevant information elsewhere in the text are indicated in italics.
- ***Key terms*** defined in the back of the manual are designated in bold italics.
- **Important words** and **ideas** are emphasized in bold.

Your comments

Comments on the manual are requested and will be gratefully received. Please inform us of any errors so that they may be corrected in the next edition. Resources listed with each unit represent a selection of the publications that are available; we would be happy to learn of others that you recommend. We would also appreciate any examples you have to share that illustrate the principles covered in this manual.

Table of Contents

Acknowledgments v
Preface vi

1. Program Development 11

Environmental Interpretive Centers 14
Environmental Interpretive Programs 16
Steps in Designing an Interpretive Program 18
Steps in Designing Activities 25
Appendix 1A: Learning Styles 30
Appendix 1B: How Adults and Children Learn 32
Appendix 1C: Visual Media for Interpretation 36
Appendix 1D: Resources for Program Development 41

2. Interpretive Exhibits 43

Exhibition Message 45
Designing the Exhibition Space 46
Exhibit Materials 48
Types of Exhibits 49
Exhibit Design 51
Outdoor Exhibits 64
Appendix 2A: The Color Wheel 72
Appendix 2B: Handmade Lettering 73
Appendix 2C: Professional Exhibit Production 74
Appendix 2D: Making Outdoor Signs and Displays 78
Appendix 2E: Resources for Interpretive Exhibits 81

3. Interpretive Presentations 83

Preparing an Interpretive Presentation 87
Presentation Style 89
Using Visual Aids in Your Presentations 90
Interpretive Tours 92

Other Types of Guided Activities 95
Working with Schools 97
Logistics 99
Appendix 3A: Activities for Children 102
Appendix 3B: Training Tour Guides 108
Appendix 3C: Resources for Interpretive Presentations 110

4. Community Outreach 113

Audiences for Community Outreach 116
Forming Partnerships 118
Community Outreach Activities 119
  Communication Methods 119
  Exhibits 125
  Presentations 128
  Environmental and Ecology Clubs 131
  Special Events 132
  Other Outreach Media 133
Appendix 4A: Facilitating Discussions 135
Appendix 4B: Creating a Slide Show 139
Appendix 4C: Creating a Puppet Show 146
Appendix 4D: Resources for Community Outreach 151

5. The Evaluation Process 153

Why Evaluate? 155
Basic Steps for Evaluation 158
  1. Determine Evaluation Questions 158
  2. Decide the Scope of Your Evaluation 158
  3. Choose the Method of Information Collection 161
  4. Analyze the Data and Interpret the Results 174
  5. Communicate the Evaluation Results and Act on Them 176
Appendix 5: Resources for Evaluations 179

Key Terms 181
Works Consulted 183

Program Development

UNIT 1

Program Development

This unit describes how to develop interpretive programs to encourage biodiversity conservation. Biodiversity – the variety and interdependence of life in all of its forms – is a complex concept and it can be challenging to convey information about why biodiversity is important, how it is threatened, and what we can do to conserve it. One way to do this is through interpretive programs.

Interpretive programs translate information from scientific language to "everyday language" so non-scientists can easily understand it. The interpretive style is interactive and relaxed with a focus on imparting an understanding of **meanings** and **relationships** rather than on memorizing facts. To interpret ***biodiversity*** (the biotic, "living" part of the environment), or more broadly, to interpret the ***environment*** (including both the biotic and abiotic – "non-living" – elements) formal, non-formal, and informal educational approaches may be used.

Tropical forests harbor more than half of all species.

Formal, Nonformal, and Informal Educational Approaches

- **Formal education** is most often associated with traditional schools and primarily targets children and youth. Formal education is planned and generally follows fixed procedures, such as a required curriculum for a particular grade level.
- In **nonformal education** the process is crucial; how something is taught is just as important as what is taught. While nonformal education is planned, it focuses on problem-solving and maintains a flexible approach based on learner needs.
- **Informal education** applies to situations in life that come about spontaneously, often within the family, around the neighborhood, and in everyday conversation. Informal education is sometimes called "socialization," and includes such things as learning to talk, abiding by accepted social rules, and developing a conservation ethic.

All three educational approaches are important and can complement one another. In a particular situation, one approach may be more appropriate and effective than another; however there may be occasions when all three can be used. Interpretive programs often use a nonformal education approach to promote active participation in learning about issues that are important to the learners and involve multi-age audiences.

Environmental Interpretive Centers

Environmental interpretation programs often focus on biodiversity conservation. These programs can take place in schools, but are more often taught in places such as nature centers, museums, zoological parks, and botanical gardens. In this manual, the term "environmental interpretive center" is used to describe any of the places where environmental interpretation takes place. Your interpretive center might be an empty building; an open-air meeting place; a building with exhibits, but no on- or off-site programming; or a single room at a zoo or a museum. From any of these locations, you can provide opportunities for in-depth learning experiences relating to biodiversity and its importance to visitors. An interpretive center is a place where local residents and tourists can learn about the surrounding environment and more specifically

about biodiversity issues. A center can become a focal point for action on these issues and should be a place where people come to discuss their environmental concerns and work together to create solutions. Especially in areas where books are scarce and television is unavailable, interpretive centers can be a "window on the world" by providing information and raising the consciousness of the curious.

As educational facilities, interpretive centers are unique because:

- Learning is voluntary and visitors are self-motivated. At interpretive centers, self-directed learning can take place through activities that allow a visitor to approach an exhibit from his or her own level of understanding, and to set his or her own pace.
- The learning experience can be repeated, allowing for further exploration, greater understanding, and reinforcement of what was learned during an earlier visit. If the first visit was interesting and enjoyable, a visitor may also wish to introduce others to the center.
- Exhibits and programs at interpretive centers can be designed for participants of all ages. Family learning and interaction can be encouraged, opening the way for discussion and reinforcement at home following a visit.

- Since visits to environmental interpretive centers are not "graded," rewards and satisfaction are within the reach of every visitor; everyone can have a positive experience.

Your audience at an interpretive center is generally made up of a cross-section of people who participate in a program for a variety of reasons. People often learn at different rates and in different ways, so many interpretive centers provide programming that includes different types of activities to reach as wide an audience as possible. *See Appendix 1A: "Learn-ing Styles" and Appendix 1B: "How Adults and Children Learn."*

- Interpretive centers can complement traditional schools by offering information on topics covered only briefly, or not at all, in the school curriculum, and can exhibit visual images and objects that schools do not have. In addition, an interpretive center and school can work together to design lessons to reinforce the school's curriculum. Preparatory and follow-up sessions at the school can make a visit to the center more meaningful for students. *See "Working with Schools" in Unit 3: "Interpretive Presentations," page 97.*

Environmental Interpretive Programs

Your role as an environmental educator is to facilitate learning through active involvement; you can make education a process of discovery by designing activities or exhibits that offer different ways to learn. Throughout this process, you should be open to suggestions, allowing participants to influence the direction an activity takes, while at the same time providing the information and structure for an effective learning experience. Often, combining nonformal, formal, and informal approaches can help you to do this effectively.

Your educational approach should encourage environmentally responsible behavior by fostering:

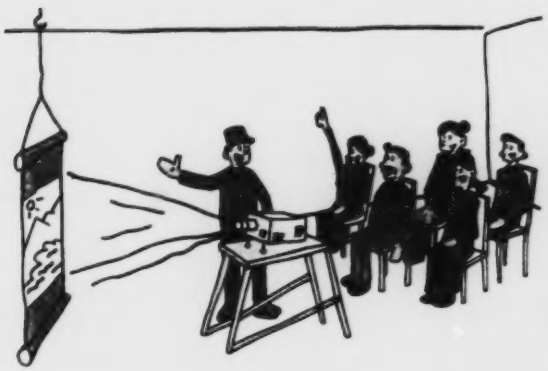
- **Awareness** – A sensitivity to the environment and associated problems
- **Knowledge** – An understanding of how the environment functions, how people interact with and depend on the environment, and how environmental problems may be solved
- **Attitudes** – A concern for the environment and the personal motivation and commitment to participate in environmental improvement and protection
- **Skills** – The ability to identify and investigate environmental problems and to contribute to their resolution
- **Participation** – Active involvement in working toward the resolution of environmental problems

(United Nations Educational, Scientific and Cultural Organization - United Nations Environment Programme 1978, 1-7.)

As an environmental educator, you can encourage people to learn more about their environment and make informed decisions about their use of natural resources. Your commit-ment to biodiversity conservation provides an example for community members and encourages them to educate those around them as well. As more people understand the significance of biodiversity conservation issues, you will be able to foster in your community the cooperative efforts required to resolve such issues.

The types of interpretive programming you can develop generally fall into three categories: **Interpretive exhibits** consist of displays of objects or graphics that visitors interact with and explore on their own at an interpretive center.

Interpretive presentations may be scheduled activities, classes, workshops, or tours. The educator offers information and encourages visitor ***participation*** and learning through experience.



Community outreach can be an effective way to reinforce what visitors learn at the center. It also allows the educator to reach audiences who do not have the opportunity to visit the interpretive center. Outreach activities may include presentations (slide shows, films, puppet shows, dramatic sketches), portable exhibits, media campaigns, community meetings, and special events.

Your interpretive center may combine activities from all three of these categories, depending upon your resources, the audiences, and the issues addressed. The steps for developing interpretive programs are outlined in this unit as an introduction to discussions in the following units on how to design activities for each program category.

Steps in Designing an Interpretive Program

Throughout this manual, we use the term "program" to refer to a collection of information, activities, and exhibits that together comprise a cohesive, focused approach to education about biodiversity. Activities and exhibits are the means by which you convey your messages to audiences. There are six basic steps to follow when designing an environmental interpretive program. Though these are similar to the steps you will follow in designing activities (detailed later in this unit), they involve thinking at a more comprehensive level. The six steps are:

1. Research the context for your program
2. Define and research the biodiversity issues that you will address
3. Identify your audiences
4. Set goals and objectives
5. Define your budget
6. Make a plan for evaluating the program

Planning programs is a dynamic process. As you plan, be flexible and be prepared to revisit some of the steps as you go along in order to be most effective. You may have to adapt your program design in response to your audience's needs, changes in the environment (both natural and man-made), or changes in resource availability (financial, material, and human).

1. Research the Context for Your Program

If you are new to the community, start by learning about the surroundings that form the context for your program. Even if you are a member of the community, it is a good idea to take a step back and look at the environment in which you live and work. This means more than the "natural" environment; it also includes the social and political context. Find out about community history. Some questions you might ask are: Does the community have previous experience with environmental education or similar educational programs in health or agriculture? What worked or did not work with these programs? Try to learn from and build on this past experience.

Community participation is essential. Investigate the skills and resources among the different members of your community. Are there people who might contribute valuable ideas, talents, and resources to your program? Would it be appropriate to establish an advisory group for your center? Potential advisors include local residents concerned with their environment, regional conservation organizations, and representatives of government and industry. Advisors can represent attitudes and concerns of your target audience, make recommendations about program content and logistics, provide resources, and promote your center in the community. You may meet with advisors as a group, or consult with them individually as needed.

2. Define and Research the Biodiversity Issues that You Will Address

Identify the biodiversity issues that affect the region or country where you live and work. Observe and work with local people to find out what is important to them. Conduct a ***needs assessment*** to explore questions like:

- What are the most significant environmental issues, and what are their root causes?
- Do people in the area think these issues are important?
- Who in the community can help choose and prioritize topics?

Even if your mission is determined by an outside agency, you need to make the link with locally perceived needs. *See Unit 5: "The Evaluation Process," for more about information collection methods for needs assessment.*

20

Make a list of the biodiversity issues that you identify and group them in terms of importance to your audience. For example, if your primary audience is comprised of residents of a region undergoing deforestation, issues relevant to the community may include:

- Sustainable harvest of non-timber forest products
- Maintenance of adequate fuelwood and construction supplies
- Availability of fertile land for pasture or farming
- Maintenance or improvement of crop yields
- Contamination of water courses and fresh water supplies through soil erosion
- Prevention of drought and floods
- Increased rates of diseases due to forest clearing

Which of these issues can be addressed by your environmental interpretation program? If there are other programs in place, how can your program complement these?

Researching Issues and Assessing Educational Priorities

An example in the Bay Islands of Honduras demonstrates the utility of incorporating all available information into decision-making about environmental education.

The Islands are surrounded by coral reefs, and a variety of wildlife – including threatened parrots and endemic agoutis – inhabit the forests and wetlands. Despite efforts to protect these valuable natural resources, they are under pressure due to economic development tied to the fishing industry and an increase in tourism. A rapid assessment was conducted to identify specific environmental problems and develop educational programs to address these problems.

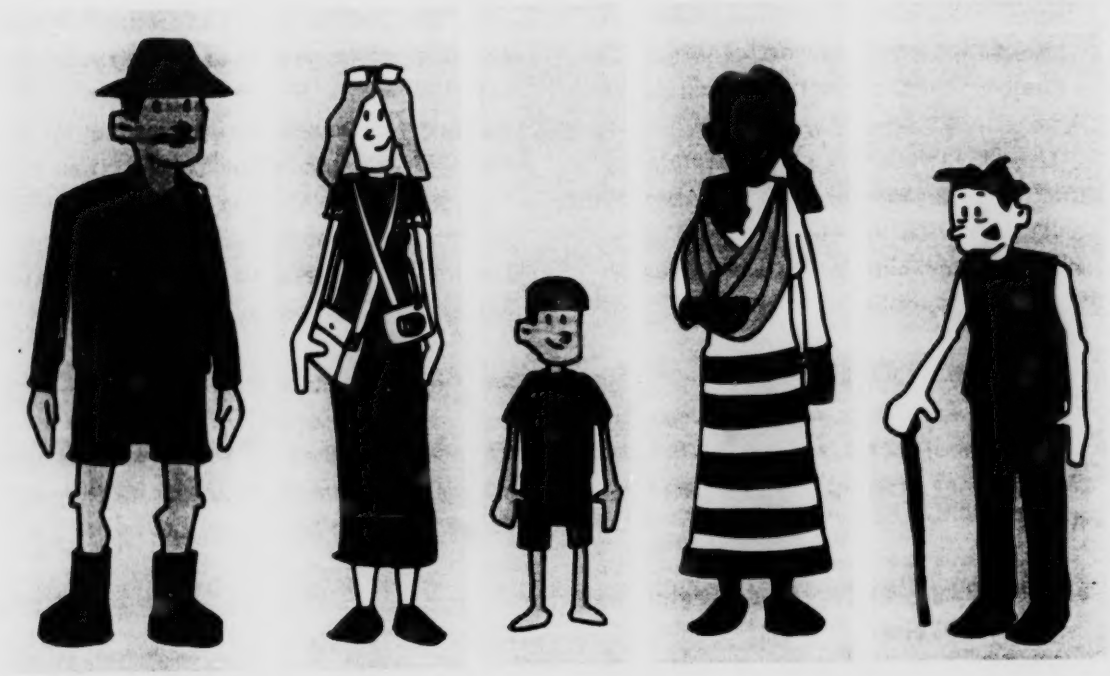
A research team interviewed experts and relevant groups and distributed written questionnaires to collect broad-based input. Workshops and informal meetings were held with various groups, including community leaders, government officials, business people, teachers, fishermen, tourists, and representatives of the tourism industry. Assessment of needs in the formal, school-based sector involved a review of the content of curriculum materials, data on national literacy rates and school enrollment, and local educational resources.

As a result of information gathered, several environmental education activities were initiated: development of a teachers' manual and teacher training workshops; publication of a guidebook on the nature and people of the Bay Islands in a bilingual format for distribution to community leaders, teachers, and tourists; and establishment of environmental resource centers where interpretive programs and materials will be available.

(Jacobson 1997,10-19.)

3. Identify Your Audiences

The audiences for your interpretive programs can include adults and children, families, school groups, members of community organizations, and tourists from nearby towns, as well as those from other regions or countries. Each of these audiences has a different level of inter-



est in and understanding of the issues you wish to present. The following are suggested ways to begin to understand your audience:

- If you currently have visitors to your interpretive center, do an inventory of who they are, where they come from, and what their interests are. You can do this by recording visitation in a guest registration book or by observing and interviewing people who come to your center.
- Determine other audiences you would like to attract to your center, such as people who are directly involved with a particular environmental problem.
- Whether you have an established center or are developing a new one, you may find it instructive to go to other centers to learn about their visitors and programs, and to see how the programs meet their audience's needs.
- Do some in-depth research about your audiences. What can be learned about their beliefs, customs, and level of education? Do these vary within the community? Do they affect the way people think about the environment? To gather this type of information to serve as baseline information, you may wish to conduct interviews. *See Unit 5: "The Evaluation Process," page 163.*

Baseline information consists of facts and data recorded at a particular point in

time. This can later be compared with new information to assess whether there has been any change from the original condition.

List the audiences you have identified through observation and research. Later in this unit we describe how you can select "target" audiences, meaning those that you want to focus on for specific activities.

4. Set Goals and Objectives

A ***goal*** is a broad statement summarizing what you would like to accomplish. For example, a goal for an interpretive program may be stated as:

To promote environmentally responsible behavior among the community surrounding the Sihanaka Forest.

An ***objective*** is a statement that describes one aspect of how the goal is to be accomplished. Generally, several objectives are necessary to accomplish a goal. Objectives state **what, when,** and **how** this will be done. Clear objectives are "SMART" objectives; they are:

Specific
Measurable
Appropriate
Realistic
Timebound

You can use the aims of environmental education shown on page 17 to develop your objectives for an interpretive program. The following are examples of objectives that contribute to attaining the example goal:

Objective 1: By the end of year three, provide **knowledge** to at least 20 people in our community per month through programs that demonstrate how people are dependent on the forest for their survival.

Objective 2: By the end of year one, implement a program of monthly discussion meetings on issues facing the community and record community members' concerns and **attitudes.**

Objective 3: By the end of year four, provide hands-on **skills** workshops every six months for local residents on conservation techniques, such as: sustainable timber harvest, tree nurseries and reforestation, marketing non-timber forest products, developing an ecotourism market.

Objective 4: By the end of year three, sponsor two community-wide environmental projects per year in which participants **practice** the skills that they learned in the skills workshops.

Objective 5: By the end of year one, hold an annual, community-wide awards ceremony that acknowledges and rewards people who exhibit environmentally responsible **behavior.**

To implement programs, it helps to further define your objectives by writing milestones – the actions that need to take place to accomplish each objective. Milestones can serve as useful markers to measure your progress. Milestones for Objective 1 on page 22 might include:

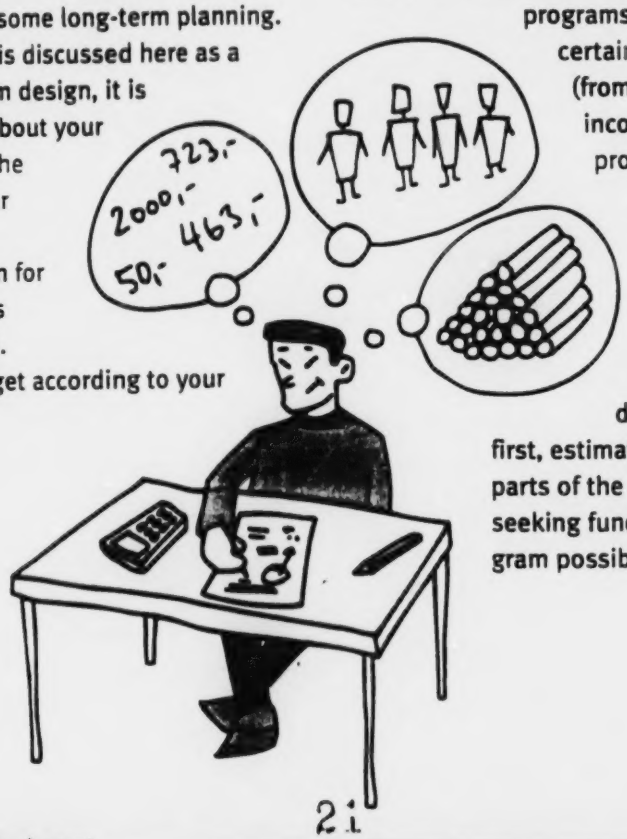
- Identify the audience
- Gather information on how people depend upon the forest
- Refine the information and design programs appropriate for the audience
- Schedule meetings with audience members and implement programs
- Plan incentives and rewards for participants

5. Define Your Budget

Defining a budget for your interpretive program (or a particular activity within the program) necessitates some long-term planning. Though the budget is discussed here as a later step in program design, it is advisable to think about your budget early on in the development of your program plan.

A budget is a plan for allocating resources (most often money). Structure your budget according to your goals and objectives; think of your budget as a way of translating goals and objectives into monetary figures. At the program level, you will have costs pertaining to personnel, facility construction and maintenance, and general supplies. For each activity you may have additional materials to purchase or transportation costs. Along with your goals and objectives, your budget can be used as a tool to assess the productivity and efficiency of your interpretive program.

A first step in defining a budget is assessing available resources. Make a list of what you have, what other organizations can provide, what supplies are available locally and how much they cost. *See the "Local Resources Inventory" table on page 24.* Then decide what else you require to carry out your interpretive programs. You may have a certain amount of money (from a grant or other income-generating process) and need to determine how you will spend it. In most cases, however, you will be working from the opposite direction – deciding on a program first, estimating costs of various parts of the program, and then seeking funding to make the program possible.



Local Resources Inventory

An important step in budgeting for your interpretive program is making a list – or conducting an inventory – of resources available to you locally. You may also have access to outside experts and materials, but it is often easier to begin with those in your community or region. These local resources also tend to be those on which you can build your program in the long term. The table below is an example of an inventory sheet that you can adapt for your location and the type of program you are developing.

Name or Agency, Address, Phone, Fax, E-mail (Type of contact*)	Expertise, Technical Support (List names and expertise)	Potential Guest Speakers (List names and topics)	Volunteers (List type of projects)	Equipment and Supplies (Note whether will donate, lend, or sell; list price if applicable)
Forest & Fish Dept. 1 Rainforest Road (Government agency)	Carlos A. – Forest Mgr. Gisèle R. – Soil Scientist Nguyen H. – Aquaculture	Dept. staff may speak on their areas of expertise also have connections with potential speakers the University		Loan monitoring equipment?
Merrymount Middle School 10 Merrymount Street (School)			Mr. Jones's science class is willing to volunteer for clean-up days (distribute flyers; work at event)	Has slide projector; rooms available for evening meetings
Quality Construction Town Center (Business)				Will donate scrap lumber, paint, and other supplies when available
Bob's Graphics Supply 15 Main Street Capital City (Business)	Bob – free consulting on Saturdays when he is in town visiting family			Sells a wide variety of low cost materials for displays

* Type of contact could include categories such as: environmental agencies or organizations, local businesses, civic or community organizations, schools, and individuals.

Many funding agencies require a budget when you apply for money. They may only be interested in funding particular items in your budget. For example, some agencies fund programs for women, while others fund only agricultural or educational programs. Set priorities so that if you cannot get funding for the entire program, you can begin with the parts that you think are most important while continuing to work to acquire additional funding. Consider time constraints; often, budgeted funds must be used within a certain period of time, meeting deadlines for products or project completion.

A budget should have some flexibility. You will almost always incur costs you did not

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anticipate. However, there may be occasions when you are able to carry out an activity at a lower cost than expected (you may find materials on sale or get donations), allowing you to expand on a particular activity or to apply the unused funds to something else (depending on the terms of the agreement with donors).

6. Make a Plan for Evaluating the Program

Evaluation is the process of making a judgment about the worth of something. This judgment is based on evidence collected to determine if certain objectives have been met. Evaluation should occur as a process throughout the design and implementation of an interpretive program and of the activities that comprise the program. Keep records of the information you gather, people you consult, and what you do from the very beginning. This will be important for you to reflect on as you develop and refine your program. It is also useful for telling others, including current and potential funders, about what you have accomplished.

You can monitor your progress as part of your regular activities. Monitoring is a continuous process based on the collection of information on a regular basis. There are some things that you will be able to observe as you go along. Ask yourself questions like:

- How many people attended my presentation or viewed an exhibit? Is this more or less than last week?
- What were the visitors' reactions to the presentation or exhibit (as observed or reported)? Were they involved in the activity? Did they ask questions or engage in discussion during a presentation?
- Are community members interested in forming an ecology club, or learning management techniques for reforestation or preventing erosion?

These observations are important and allow for immediate, incremental adjustments in your center's interpretive program. However, a systematic evaluation is essential to better understand what works or does not work, and why, within a defined period of time. While you may observe changes in the behavior or attitudes of visitors, a careful evaluation helps to distinguish between changes catalyzed by your interpretive program and those influenced by other factors. *A more detailed description of evaluation is found in Unit 5: "The Evaluation Process."*

Steps in Designing Activities

Whether you are planning exhibits, presentations, or community outreach activities, there are four basic steps in developing an interpretive activity after you have designed the overall program:

a. Choose the issue
b. Develop a message related to the issue
c. Select the target audience
d. Produce the activity

a. Choose the Issue

Review the issues you identified during the program design phase (*see page 19*). Ask representatives of your audience to help decide which of these are priorities. Select the issue that you will address in a particular activity. For example, farmers in your community may not produce as much rice as they used to. Upon researching the situation, you may discover that erosion is causing siltation in the rice fields. Tracing the causes of erosion may reveal that deforestation upstream has increased in the recent past.

An activity may be designed to increase understanding of an issue – in this case, declining rice productivity – but may deal more specifically with one of the factors contributing to this issue, such as erosion or deforestation.

b. Develop a Message Related to the Issue

Each environmental interpretive activity should have a central ***message***, an idea or concept to be conveyed to the audience, based on the issue(s) identified in the previous step (a). Education that carries a message helps keep the activity focused, and makes it more interesting and easier for the audience to understand.

The message should be simple, specific, and tailored to the audience. People are likely to pay attention and respond to a message if it relates to their needs and interests. However, most people cannot absorb and process a lot of information at once. If an interpretive activity has a clear message and contains only three to five main ideas, it is more likely to capture the interest of the audience and be remembered. An effective activity begins with information the audience already knows and builds on it to increase their understanding of

the environment and humans' relationship to it. As you identify a message for an interpretive activity, some questions to guide you are:

- How can the interpretive activity encourage audience participation in the resolution of the environmental problem?
- What knowledge and attitudes should the audience acquire in order to contribute effectively to solving the environmental problem?
- What message do you want the audience to take away with them?
- What behaviors that impact environmental problems do you want the audience to examine critically?
- What skills training can the audience receive to help them resolve environmental problems and improve their lives?

c. Select the Target Audience

Most environmental issues will suggest several target audiences. A ***target audience*** is a definable group of people who are affected by or have an effect on an environmental problem. Through education, these people have the potential to help solve the problem.

If the actions of certain groups of people have a greater direct impact on the environment than other groups, you may wish to target activities to this particular audience because their involvement is necessary to achieve a specific goal. In thinking about targeting a specific audience, you need to have a clear understanding of:

- The environmental issues
- The audience profile: age, education, beliefs
- How an issue affects the audience
- The message you want to convey
- How you want the audience to respond to the message

In order for people to respond to a message, it must be relevant to them. Focusing on inappropriate messages for a particular audience can be a waste of time and effort for both you and your audience. For instance, an overview of the rich biodiversity of the plants and animals found in a rainforest may hold little interest for local rice farmers unless it includes a discussion of how these plants and animals affect farmers' lives. Information must be presented on how the conservation and maintenance of biodiversity contributes to a healthy forest that in turn regulates water flow and decreases the incidence of flooding or droughts in the farmer's fields below.

d. Produce the Activity

An activity can take the form of an exhibit, talk, video presentation, game, or tour – there are many other possible kinds of activities as well. Regardless of its type, an activity should include an introduction, presentation of the information, and a conclusion.

- **The introduction** presents the message and main ideas to which the activity relates. This helps the audience to focus on the main points of the presentation.

- The **body of the presentation** contains information, or evidence, and generally includes illustrations and examples.
- The **conclusion** restates the main ideas and summarizes the message.

Interpretive activities of any kind are generally highly visual. People often learn best when they are able to take in information using different senses – by seeing, hearing, and doing. *See Appendix 1A: "Learning Styles."* Because objects, audio and visual media, and experience are central to interpretation and assist in multi-sensory learning, considering ways to convey your message through these means is essential. *Appendix 1C: "Visual Media for Interpretation"* describes some of the many ways you can make your interpretive activities visual.

To produce interpretive activities that are appropriate for your audience and message, and that utilize your skills and resources, consider questions like the following:

- How does your audience currently receive information?
- Do they come to your center or do you need to go to them?
- Can your audience read? Do they have experience interpreting visual images? Do they learn by listening?
- Are they comfortable handling objects and other materials? Do they like to make things, play games, or participate in demonstrations and observations?

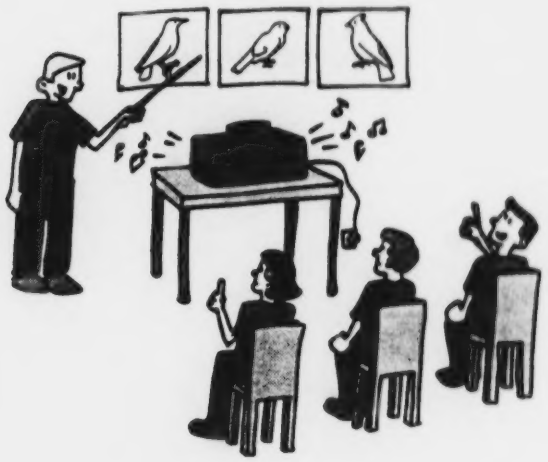
- How much information do you feel you need to convey? Is the information simple or complicated? Would a series of activities be useful for conveying the message?
- Do you have the materials, expertise, and staff necessary to carry out proposed activities?
- What are your time constraints for the activities or programs?

The following three units describe some of the possibilities and techniques specific to the three main categories of interpretive programming: exhibits, presentations, and community outreach. Unit 5 then outlines the process of evaluation, which is essential for all types of interpretive programs and activities.

Appendix 1A Learning Styles

This appendix outlines some information on **learning styles** that you may find useful to think about whether you are planning an exhibit, a guided tour, or a community outreach activity. Because there is wide variation in learning styles among individuals, there can be no single correct educational approach. Successful education requires the participation and cooperation of both teacher and student.

Successful educators not only get to know their audience, but also learn to "read" their audience and are capable of adapting their teaching style to meet individual needs and interests. This ability is heightened by an understanding of how people learn, the developmental stages of learners, and the realization that we all have a preferred learning style. As an educator, you should also be aware of your own learning style so that you include other styles when teaching.



Learning styles develop very early and tend to remain constant throughout life. Although the style of learning does not reflect on a person's intelligence, it does influence how he or she processes information. When presented with information, we generally take it in via our preferred sense and use other senses secondarily to complete the picture. We are most comfortable learning, pay closer attention, and retain more information when we can utilize our preferred sense. Three categories describe sensory preferences:

Auditory learners are listeners. They learn new information best by hearing it.

Visual learners like to read and observe to learn new information. They often have strong visual memories of their experiences.

Action-oriented individuals learn best through hands-on experience (role-plays, discussions, experimentation).

Although we each may favor one learning style over the others, most people do not learn exclusively by either hearing, seeing, or doing. Ideally, your educational approach should appeal to each of these sensory preferences in order to reach learners with different styles and

strengths, as well as to enhance the learning experience of any one learner. For example, activities about identifying migratory birds that overwinter in a particular region might include:

- A recording of bird songs
- An illustrated text describing characteristics of the migratory bird species
- A game in which participants match a bird with its forest habitat (or food source)

Allowing for different backgrounds and styles of learning can be challenging, especially if you have a large group and few resources. With individuals who are not fluent in the language you are using, visual, action-oriented approaches should dominate your program. If your audience is not literate, action-oriented, auditory activities are best, though visual symbols may also be effective.

Educational techniques should enable students to learn a body of knowledge with the aim of understanding and thinking about it critically and creatively. If you work with a particular learner or group of learners over an extended period of time, you may be able to determine the appropriate balance of activities to stimulate their senses by observing how they respond. Consider what the dominant ways of learning are in your community and how culture or other factors may influence these.

Appendix 1B How Adults and Children Learn

Biodiversity education is important for both children and adults. Children are an important target audience because they are developing attitudes about their world that will influence their decisions in the future. If they recognize the importance of conserving biodiversity at an early age, they will begin to incorporate this into their behavior. In many cases, children can set an example in their communities through participation in conservation projects. At the same time, targeting adults is essential for addressing current issues. Adults, with their well-established ways, need to be exposed to information that is relevant to their needs. It is essential that they be involved in designing solutions, so they do not feel that changes will threaten their livelihood. Adults have a wealth of knowledge and experience that can be brought to bear in seeking solutions to environmental problems. Some teaching strategies are effective with people of all ages, but there are important differences in the way that adults and children learn, and these should be taken into consideration when working with these audiences.

Child Development

A basic understanding of cognitive development (the development of mental processes such as thinking and knowing) can be very useful for planning an interpretive program for children. As they mature, children pass through a series of developmental stages that affect their ability to learn. Young children need to learn in a different way than older children because they are at different stages in developing motor, spatial, and reasoning skills.

Some Differences between Adults and Children as Learners

Adults:	Children:
○ Want to learn something they can use right away ○ Have a wealth of experience ○ Often know what they want to learn ○ Learn differently and at different rates	○ Are taught lessons that are meant to be used throughout their lives ○ Have limited life experiences ○ May require more guidance ○ May be at similar developmental stages, but have different learning styles

(NAAEE 1994, 7.)

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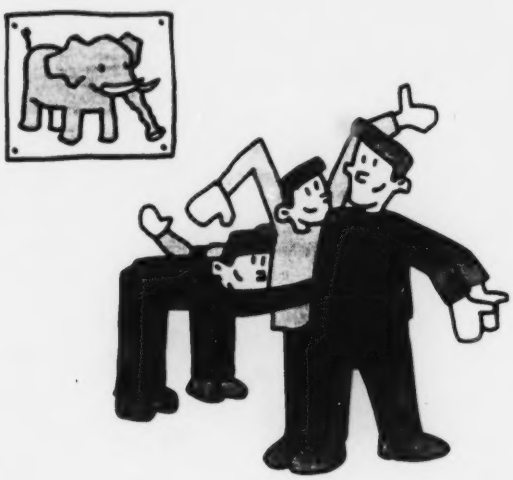
In **early childhood** (approximately ages 3-6*), effective interpretation involves games and play. Games of "pretend" in which children use their imaginations are appealing, whereas logic and reasoning skills are weak. Young children tend to be self-oriented and have short attention spans. They often make statements, such as "My uncle has a pet bird,"



rather than asking questions directly relating to the topic of the lesson. Strategies for working with young children include activities that involve sensory exploration – looking, touching, listening, and smelling. Puppet shows, stories, and songs that engage the imagination can hold a group's attention for a surprisingly long time. Children at this stage need structure and guidance.

Example activities:

- Choose an animal and have children pretend to be different parts (e.g., mouth, ears, claws, wings, tail). In groups of four or five, children can perform while others guess what animal they are imitating.
- Have children look for things in nature to match colors. Use colored paper, cloth, crayons or other objects to serve as sample colors if they are available.

In **middle childhood** (approximately ages 7-10), the ability to understand logical relationships increases, but is based on direct personal experience. Children develop a sense of space, time, cause and effect. They are able to classify objects according to their similarities and differences, or order them sequentially. While children at this stage generally cannot grasp the complexity of many environmental issues, they know right from wrong and also feel a need to follow group norms. They may be attracted by the idea of "saving

* Ages are provided as a general guideline; these may vary greatly among individuals, depending upon their ability and prior educational experience.

the earth," through simple behaviors such as recycling or turning off lights.

Example activities:

- Have children collect leaves that have fallen to the ground and classify them. Talk about how the leaves are related in size, shape, or color. Discuss the possible reasons for these different attributes.
- Have children grow seedlings of the same variety of plant under different conditions, simulating floods, drought, acid rain or other pollutants found in your area, as well as normal conditions. Use only safe chemicals to alter the pH of the soil or to mimic pollutants. Observe results after several weeks and discuss your findings in relation to environmental problems in your region.

In **late childhood to adolescence** (approximately ages 11-15), social concerns often override learning concerns and peer acceptance is crucial. Children may be subject to quick emotional changes. At the same time, their ability to reason and to understand abstract concepts is approaching that of an adult. Children at this age enjoy discussing different points of view, assuming the perspectives of others through role-play activities. *See Appendix 4A: "Facilitating Discussions" for an example of role-play.* They can also think about an issue, not only in the present, but also in the past and future, as it changes over time. Adolescents are making the transition from childhood to adulthood and need to take on greater social responsibility. Consider how your center can recognize these youth for their involvement in conservation projects; post their names on a list at your center or invite parents to a presentation by the youth.

Example activities:

- Ask children to design and present programs for younger children. They can make up a story, puppet show, or play and perform it.
- Children can write a column in the center newsletter (if you have one) or take responsibility for a community message board at the center.
- Simulate a town meeting in which students take on the roles of different community members to discuss an environmental problem.

(Much of the information in this section is drawn from Regnier, Gross, and Zimmerman 1994, 83-89.)

Adult Learning

Adult learners are interested and motivated to learn about things that relate to problems they currently face. Following are suggestions for facilitating adult learning:

Address the needs and interests of adults

- Take peer groups into account when convening adult learners. In many societies, groups are formed according to gender, status, age, or interests. Within peer groups, adults are more likely to feel at ease, express their concerns openly, and support one another.

- Allow adults to help define what is needed in their learning experience. Adults will absorb more if learning is self-directed rather than controlled by an authority.
- Adults will learn and change behavior when they perceive a need for new and better strategies. If adults think that things are going smoothly with their current state of knowledge and beliefs, they may not feel a need for change.
- Teach practical, applicable information leading to improvements in participants' lives.

Respect and incorporate the experience and knowledge of adult learners

- Respect what is already known and be a good listener. Adults do not like to be told they are wrong or old-fashioned.
- Help participants integrate new knowledge with traditional wisdom and existing beliefs.
- Information that sharply contradicts existing beliefs and practices is likely to meet with resistance or even rejection. Such information is best presented with a step-by-step approach.

Work at a pace that ensures mastery

- Repetition is important, particularly in a society with an oral tradition.
- Mature adults may learn more slowly than young people, but adults have the ability to use information wisely.

Adult learning usually results in increased self-esteem

- An adult who has succeeded in changing behavior by learning something new feels empowered to act on his or her new knowledge.
- An adult who has a successful learning experience is likely to share this with others. He or she may also be supportive of education for his or her children.
- Reward adult learners. Adults, like children, appreciate praise and acknowledgment of their successes.

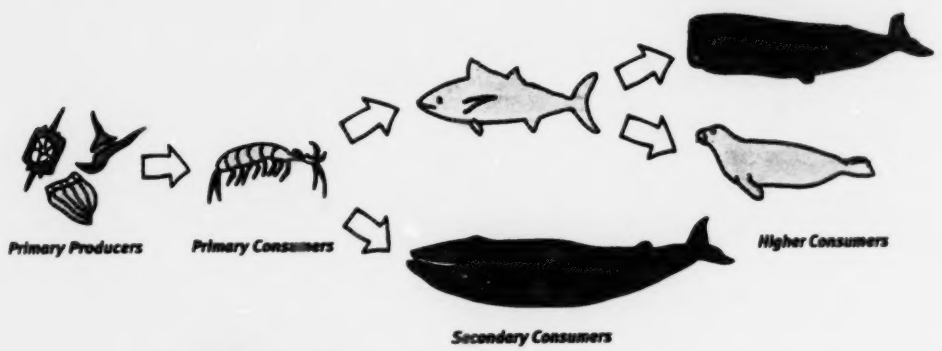
Appendix 1C Visual Media for Interpretation

Objects, visual aids, or other media can illustrate and emphasize the biodiversity message that you are trying to convey. There are many different low-cost techniques, or tools, to help you communicate your message effectively and actively engage participants in the learning experience. Interpretive exhibits are generally comprised of displays of images with some text explanations that visitors can see and sometimes touch and manipulate. In interpretive presentations and community outreach activities, visual aids are essential for illustrating information you present, as well as for assisting participants in articulating their needs and interests.

Some examples of visual media, including how to make and use them, are described here. Units 2 through 4 describe additional techniques specific to developing exhibits, presentations, and community outreach activities.

Visual Aids

Pictures such as sketches, drawings, cut-out figures, photos, or posters can represent actual or ideal situations. Pictures of familiar things can be used to encourage analysis, while pictures of things that participants have never seen can be used to broaden their view of the world around them. Pictures of con-



A two-dimensional model illustrates a simple food chain in the marine biome. A three-dimensional model, such as a mobile, could be used to illustrate a more complex system of nutrient cycling.

trasting images (e.g., a forested and a deforested area, a well-nourished child and a starving child) can serve as a basis for analysis of issues. The educator may guide discussion by asking questions such as: What do you see here? What caused this situation? What can be done about the problem? Simple pictures that allow participants to focus on a particular problem can be very effective for this type of exercise.

A **model** is a two- or three-dimensional illustration of a particular concept. It enables you to show an abstract idea, a sequence of events, or relationships among various components of a system without having to use a lot of words. For instance, to convey the concept of the interrelationship between different organisms in the marine biome, you could choose representative primary producers (phytoplankton), primary consumers (zooplankton), and secondary and higher consumers (blue whales, codfish, squid) and draw arrows along the food chain, starting with phytoplankton in sunlit, nutrient-rich water and ending with a higher consumer such as the leopard seal.

A **map** can be used as an illustration or tool for discussion about the local environment and local issues. Maps can represent the spatial distribution of natural resources, illustrate how resources are used, and potential benefits or problems relating to resource use. Participants can create or add to a map in order to talk about the social and natural systems of their communities. If your audience is not familiar with printed maps, take time to talk about the characteristics of a map and symbols that may be used, and how this information together represents the relative locations of resources, buildings, and other features. A map can be created on a large piece of paper, on a chalkboard, or by drawing with a stick in the sand or soil, and using rocks or objects to represent different attributes of the natural and human environment. Such maps are generally drawn from an aerial perspective and are not necessarily drawn to scale. If a map is drawn on the ground or on a chalkboard, it is important to have someone copy it on paper or take a photograph so it can be used for comparison at a later time.

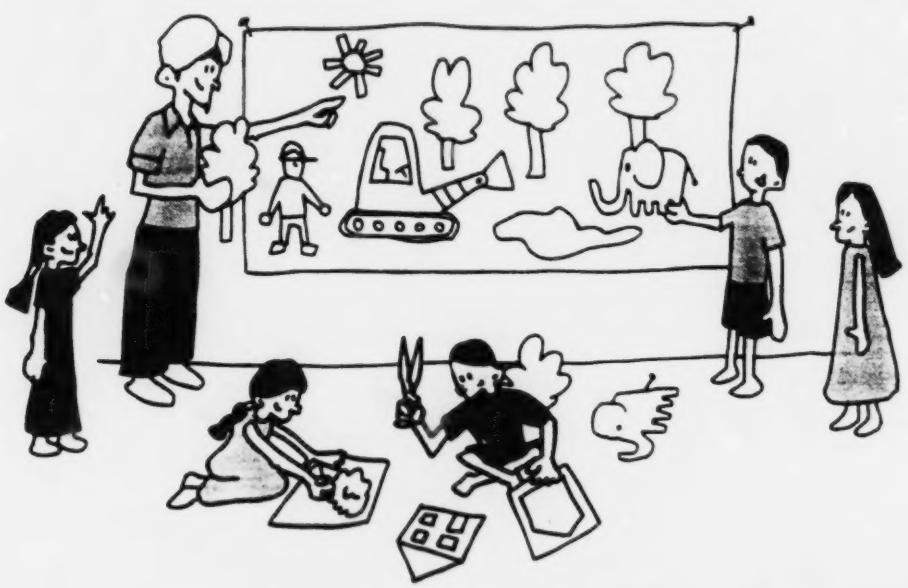
A **timeline** can be used for planning, setting goals, or showing changes over time. It should be as realistic as possible, with time periods represented in a way that shows their length relative to one another. Like a map, a timeline can be used as a discussion tool.

Making a Story Board

1. Decide what story or concept will be illustrated.
2. Develop a simple story outline.
3. Make a list of characters and figures. Use names that are familiar to your audience to personalize characters and help participants relate to different perspectives that arise in complex environmental problems. For example, a story can illustrate what happens to a forest and its inhabitants when the forest is logged and converted to agricultural land. Characters and figures might include trees, animals found in the forest, loggers, roads, trucks, bulldozers, farmers or ranchers, cattle, plants representing major crops, and houses.
4. Make the story characters and figures. Gather supplies:
   - A large piece of felt, flannel, jute or other rough fabric for the background, about 1 m high and 1.5 - 2 m long in a neutral color (gray, light green, tan).
   - Colored cloth pieces for the story characters. Paper figures may also be substituted for cloth. In order to make paper figures adhere to flannel or felt boards, spread paste or glue on the back of figures and sprinkle sand over the paste while it is wet; or paste a piece of sandpaper at the top and at the bottom on the back of each figure.

   Characters should be about 15 cm high so that they are visible to everyone in the room. Select bright colors for greatest visibility. Patterns may be made from pictures in books or magazines. Silhouettes without a lot of detail are easier to cut out; detail may be added with a black felt tip pen or paint, if necessary. Adults may tend to be more concerned about detail and proportional size of characters than are children.
5. Pin or tape the background felt piece on the wall. For discussion, additional felt pieces should be available to cut out new characters or objects to illustrate innovative solutions to problems.

(Ham 1992, 122-123.)

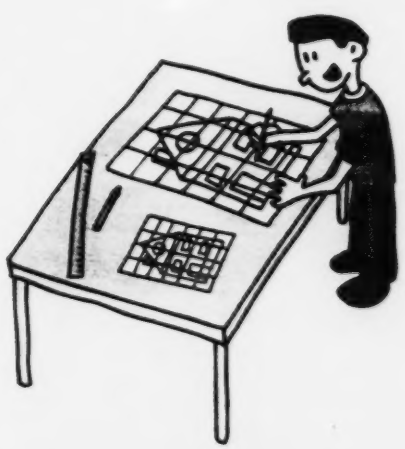


A **story board** allows the educator and audience members to manipulate cloth or paper characters or objects to tell a story or discuss an issue. Story boards made from felt, flannel, or jute allow participants to combine visual, auditory, and action-oriented learning styles in creative ways. They are easy to make and versatile. (Vella 1979, 9-31.)

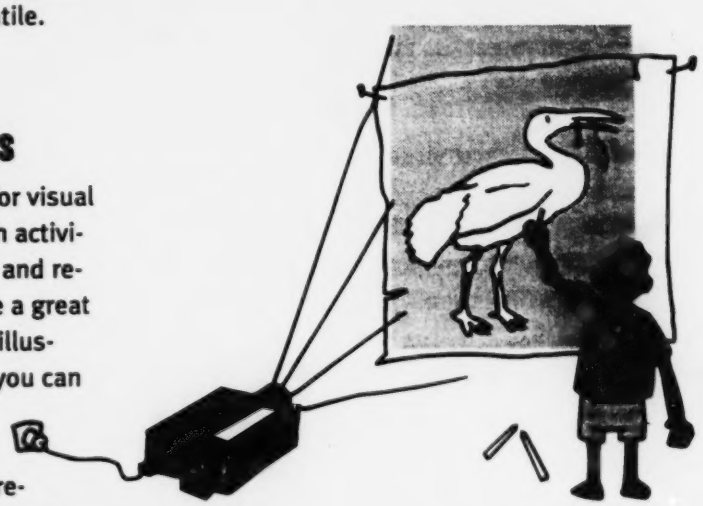
Making Your Own Illustrations

If you create your own illustrations for visual aids, exhibits, and community outreach activities, you can keep costs to a minimum and revise them easily. You do not need to be a great artist to make appealing and effective illustrations. To begin, gather images that you can use from books, magazines, or other sources. You may want to start a file of images that you think you will use frequently. Some simple methods of reproducing drawings are:

- **Trace the image**
  Place a thin piece of paper over the picture or hold the picture with a piece of paper over it up to a window or other light source, and redraw it.



- **Make a grid**
  Draw grid lines on the picture. On a piece of graph paper or blank paper on which you have drawn your own grid, replicate the original image one square at a time.



- **Project the image**
  Tape a piece of paper on a wall. Project an image onto the paper with a slide or film projector and draw around the image.
- **Use a computer**
  A scanner can be used to read an image (e.g., drawing, graph, chart, map) into a computer. The scanner digitalizes the image so that it can be processed by the computer, changed if desired, or printed. *See Appendix 2C: "Professional Exhibit Production."*

(Ham 1992, 111-116.)

Pilot-testing Visual Materials

Test all materials with representatives of potential audiences and make revisions, if necessary. Are the symbols recognizable to a pilot audience? Do the symbols or slogans used have an existing interpretation and is it the same or different than the message you intend to convey?

The experience of participants will influence how they interpret visual images. For example, people who do not have experience reading a map or interpreting figures on a graph may find it difficult to understand information presented in such formats without a great deal of guidance. Sketches may fail to convey their message if viewers do not associate the symbolic representation with what the educator intended. Cultural norms may also influence how people perceive things. It is essential that you take the time to understand the local context and consult with audience members to develop and test visual aids. As much as possible, use images familiar to your audience and avoid images or colors that they may find offensive.

o *While an enlargement shows detail, indicating actual size can help to avoid confusion.*

o *In field tests with illiterate rural adults the majority could not recognize a drawing such as this one of maize.* (Crane and St. John Hunter 1980, 89.)

Appendix 1D Resources for Program Development

Bailey, Donna, Hugh Hawes, and Grazyna Bonati. 1994. *Child-to-Child: A Resource Book.* 2nd ed. London: Child-to-Child Trust.
The Child-to-Child Trust, Institute of Education, 20 Bedford Way, London, WC1H 0AL, United Kingdom.
Tel: +44 171 612 6650 Fax: +44 171 612 6645
Part 1: Implementing the Child-to-Child Approach.
Describes an approach to teaching children, based on principles of children working with each other and taking an active role in the community.
Part 2: Child-to-Child Activity Sheets.
Activities appropriate for different stages in child development. The focus is on child health and development, but methods may be adapted for environmental topics.

Brace, Judith, Ralph R. White, and Stephen C. Bass. 1982. *Teaching Conservation in Developing Nations.* Washington, DC: Peace Corps Information Collection and Exchange.
Describes some of the places where conservation education takes place – conservation education centers, schools, health, agricultural, and community centers; also outlines some of the concepts and content for conservation education programs.

Braus, Judy A., and David Wood. 1994. *Environmental Education in the Schools: Creating a Program that Works!* Troy, Ohio: North American Association for Environmental Education. Planning interpretive programs, identifying issues, and establishing goals and objectives.

Cornell, Joseph. 1989. *Sharing the Joy of Nature: Nature Activities for All Ages.* Nevada City, California: Dawn Publications.
Identifies four stages in the process of developing nature awareness: awakening interest, focusing attention, directing the learning experience, and sharing the inspiration.

Fox, Helen. 1989. *Nonformal Education Manual.* Washington, DC: Peace Corps Information Collection and Exchange.
Defines nonformal education and describes how to put a nonformal education approach into action. Also covers characteristics of adult learners, conducting a needs assessment (using observations, interviews, situational analysis, group discussions), and planning programs.

Ham, Sam H. 1992. *Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets.* Golden, Colorado: North American Press.
Discusses principles of interpretation and developing a message. Provides many references and international examples, and a list of organizations working in the field of interpretation.

Knudson, Douglas M., Ted T. Cable, and Larry Beck. 1995. *Interpretation of Cultural and Natural Resources.* State College, Pennsylvania: Venture Publishing, Inc.
Discusses the theory and practice of interpretation, including the role of interpretation in addressing environmental issues. Also covers learning theories (pages 165-184).

NAAEE. 1994. *Action Models in Adult Environmental Education.* Troy, Ohio: North American Association for Environmental Education.
A summary of an adult education workshop with lists from brainstorming sessions and a bibliography of adult education resources.

Regnier, Kathleen, Michael Gross, and Ron Zimmerman. 1994. *The Interpreter's Guidebook: Techniques for Programs and Presentations.* 3rd ed. Interpreter's Handbook Series. Stevens Point, Wisconsin: UW-SP Foundation Press, Inc.
Covers props, slide talks, and interpretation for children (pages 81-90).

Stone, Ralph. 1997. *What's Your Role? Training for Organisational Impact. A Guide for Training Officers in Protected Area Management.* African Biodiversity Series, No. 5. Washington, DC: Biodiversity Support Program.
Provides a brief description of adult learners (pages 1-4 to 1-6).

Vella, Jane K. 1979. *Visual Aids for Nonformal Education.* Amherst, Massachusetts: Center for International Education, University of Massachusetts.
Publications Officer, 285 Hills South, University of Massachusetts, Amherst, Massachusetts 01003, USA.
This booklet covers creative and innovative ways to produce simple, inexpensive visual aids for facilitating discussion.

Wilson, Ruth A., ed. 1994. *Environmental Education at the Early Childhood Level.* Troy, Ohio: North American Association for Environmental Education.
Outlines some of the major developmental characteristics of children in early childhood.

Wood, David S., and Diane Walton Wood. 1988. *Conservation Education: A Planning Guide.* Washington, DC: Peace Corps Information Collection and Exchange.
Describes the importance of understanding the context in which you work. Discusses widespread environmental problems and appropriate educational approaches to address these problems; as well as how to make a connection between your audience, the message, and the outcome of an educational program.

Interpretive Exhibits

UNIT 2

Interpretive Exhibits

An exhibition is one of the most common forms of interpretive communication. It is a display of graphics or objects assembled to convey a message to viewers. Visitors can view exhibitions at their own pace, generally without a guide.

The term **"exhibit"** is used here to describe the components of an ***exhibition*** – the panels, objects, or signs used to interpret an environmental issue. An exhibit need not be expensive or elaborate to be effective. Whether large or small, simple or complex, effective exhibits are:

- **Visually pleasing**
  An exhibit should attract the visitor's attention through the use of color, balance, visual images, and interesting objects.
- **Relevant to viewers**
  Viewers should be able to relate to the ideas and the way in which they are presented in an exhibit.
- **Organized**
  Exhibits should help to direct viewers in their exploration of a topic by presenting information in a clear, systematic way.
- **Easy to read**
  The overall message of the exhibition should be instantly recognizable. Written material may be used to support visual images or to provide in-depth information. In either case, the text should be brief and easy to read.

This unit provides general guidelines for the design and development of exhibits. These guidelines should not be treated as strict rules; creativity and imagination are essential in the exhibition development process.

Exhibition Message

To design an exhibition or the component exhibits, choose an environmental issue and develop a ***message*** relating to this issue. It is important to develop your exhibition message at an early stage, before deciding upon display texts and illustrations, as the message will ultimately shape the whole form and purpose of your exhibition. Good exhibitions make a connection between the message and visitors; your message should be memorable and the way you present it through an exhibit should increase your visitors' understanding of an issue.

Representatives of your ***target audience*** – the people whom you are aiming to reach – can provide valuable input, making suggestions regarding the information to include in your exhibition and how it is presented. Involve them in developing ideas and testing exhibits. Respect traditional wisdom and the customs of the area; consult with community

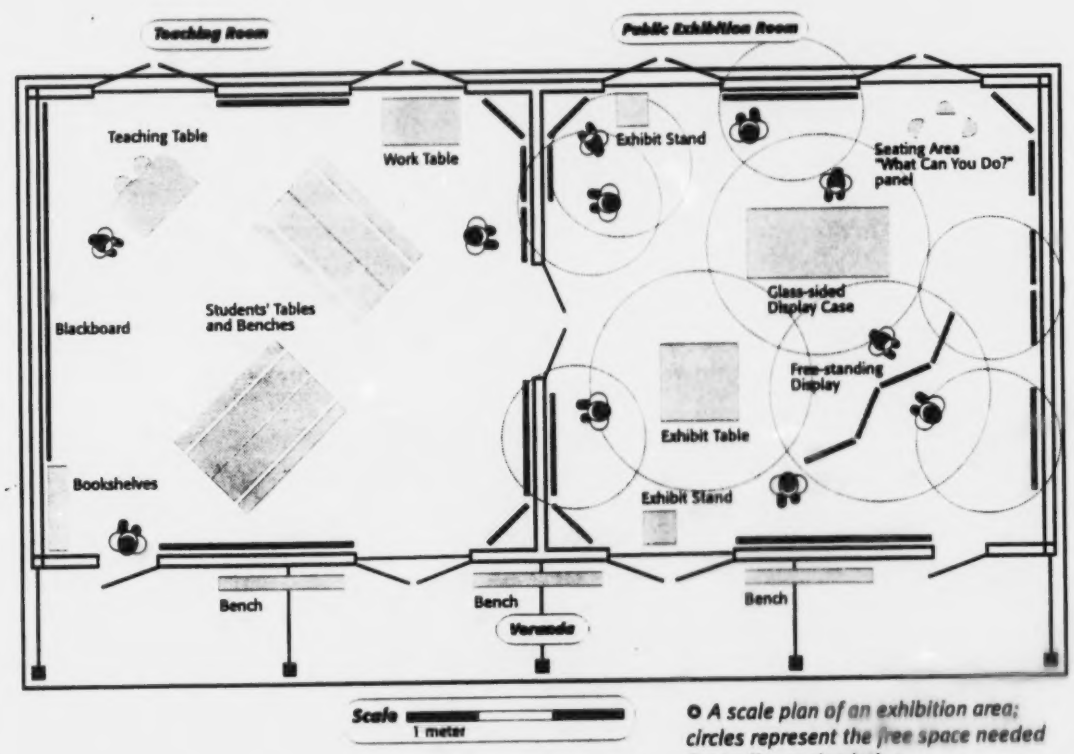
elders and incorporate their ideas. This encourages community participation and can contribute to a feeling of pride in the interpretive center. If possible, work with a team to generate ideas and share tasks in creating your message and exhibition. *For more information on developing a message and identifying your target audience, see Unit 1: "Program Development," which outlines the steps in developing an overall program framework.*

When developing a message for your target audience, ask yourself the following questions:

- For whom is your exhibition designed (e.g., which age ranges, which cultural groups)?
- Which languages or dialects should you use?
- What is the literacy level of your audience?

Designing the Exhibition Space

If an exhibition is to occupy a room or any significant indoor area, it is useful to have a plan of that space. Plans can often be obtained from the architect or building contractor involved in designing and constructing your interpretive center, or from the local civic office or county council. If a plan already exists, you can copy it and mark the arrangement of various exhibition components. Otherwise, you will need to measure the room, noting locations of doors, windows, columns, and other permanent fixtures in order to create a scale drawing. In a drawing that is made "to scale," a designated measurement on paper rep-



A scale plan of an exhibition area; circles represent the free space needed for audience circulation

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resents the space in the actual exhibition area. For example, you may select a unit for the scale drawing such as 5 cm to represent 1 m in the actual exhibit space. If you have graph paper, you can assign a scale to the graph squares (e.g., one square = 0.5 m). Scale drawings and plans are also useful for the design of outdoor exhibitions that are discussed later in this unit.

Floor plans for an exhibition should be designed so that visitors can circulate easily; generally, they should not have to retrace their steps through a section they have already viewed to get to another part of the exhibition. However, visitors should not be prevented from returning to displays that they wish to see again. Exhibit sections should be designed so that they are independent and do not rely on information in another section. If you have essential information for visitors, present this on panels at entrances and exits so visitors will be sure to see it.

Consider your exhibition space in three dimensions; use the whole area including the floor, ceiling, and the space in between. To optimize your available display space and to help make exhibits dynamic, extend exhibits out onto the floor or overhead. For example:

- Paint footprints of endemic animals on the floor. Create a game that involves identifying the footprints or use the footprints to guide visitors to a particular area or display.
- Hang paper birds or other models from the ceiling.

Another factor to consider when deciding how to place exhibits is the available light. Natural light from a window can provide illumination for exhibits, but direct sunlight can cause colors in a display to fade. If you have

access to electricity, you may be able to use artificial lighting to enhance your exhibits. However, you should be aware of possible glare from the lighting that might make your display more difficult to view.

Allow space in the exhibition area where visitors can sit and comfortably contemplate exhibits. Visitors may rush through an exhibit if their feet are tired. Be sure that drinking water and toilets are available. Think about access and facilities for visitors with special needs such as young children, the elderly, or people with physical handicaps. For those with limited mobility (e.g., use a wheelchair, cane, or have difficulty walking), have a ramp available to place over any stairs. Make sure that doorways, passageways, and bathrooms can accommodate a wheelchair. In addition, for the safety of visitors, the exhibition space should have adequate exits and fire extinguishers in case of a fire, as well as first-aid equipment.

Exhibit Materials

When designing any kind of exhibition, but particularly one that conveys a message about biodiversity conservation, the materials you select for constructing exhibits deserve careful consideration. If you advocate conservation, but use materials that come from threatened species, you contribute to biodiversity loss and confuse your message. It is important to weigh environmental impact along with cost, durability, and appearance of exhibit materials. *Review the "Local Resources Inventory" table in Unit 1: "Program Development," page 24; add new items or make a new table specific to exhibition materials.*

It is generally best for the natural environment, and often most economical, to use local materials. Look for wood from tree species that are not threatened by over-harvesting. Try to purchase wood that is recommended by a wood certification program. These programs use a number of criteria to ensure that trees are sustainably grown and harvested, such as felling methods that cause minimal damage to surrounding trees. *See program listings in Appendix 2E: "Resources for Interpretive Exhibits."*

Look for recycled wood, paper, or plastics to use in your exhibition as alternatives to virgin materials. When modifying exhibitions or constructing new ones, try to reuse materials that you already have. If this is not possible, are there others who might have a use for them, such as local schools? Is there a place where you can take wood, metal, paper, glass, or plastic to be recycled?

The physical environment within which an artifact or specimen is exhibited is a determining factor in the long-term preservation of the object. When exhibiting artifacts, it is important to consider such issues as: lighting, temperature, relative humidity (the amount of moisture in the air), and case or display construction materials. If these elements of an exhibit are not controlled and monitored, specimens can be irreversibly damaged through a variety of deterioration processes.

High levels of light in combination with fluctuating or high relative humidity and temperatures will deteriorate organic materials

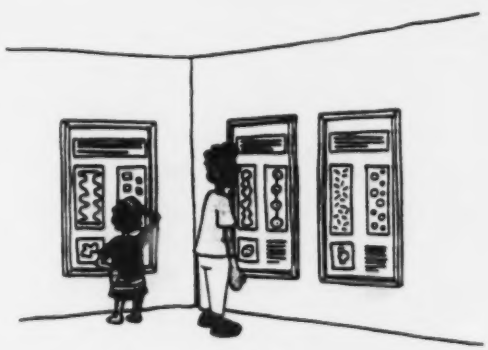
such as plants, paper, and skins. Additionally, exhibit construction materials (e.g., wood, plywood, glue, and fabrics) may produce concentrations of volatile acids, especially within an enclosed case, that will deteriorate both organic and inorganic substances. Before a material is approved for use in case construction, its composition and potential "off-gassing" of volatile acids should be determined. *See Appendix 2E: "Resources for Interpretive Exhibits," for publications that may guide you in determining appropriate materials for exhibit design.*

Types of Exhibits

There are a number of factors to assess before choosing the type of exhibit you will create. The available space, resources, and materials (those used to construct the exhibit, as well as artifacts and artwork to be displayed) will dictate what you are able to produce. It is equally important to think about what kind of exhibit is most appropriate for conveying your message and is best suited to the preferences of your audiences. Consider the advantages and disadvantages of a temporary versus a more permanent exhibit. Changing exhibits periodically helps to attract repeat visitors (the timing and frequency of changes might be based on budget constraints, seasonal changes, or availability of exhibit or artifact loans from museums or universities). Four types of exhibits are described here.

Wall Exhibits

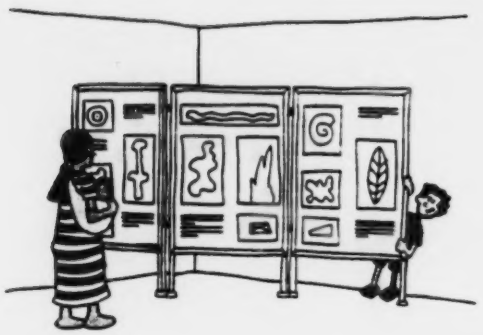
A wall exhibit can be mounted on one or more walls of the interpretive center. Although exhibits can be painted or glued directly onto the wall, this limits the flexibility of your exhibition space for future use. As an alternative, you can construct wooden or cork panels to attach to the walls, or use materials such as carpeting, cloth, woven mats, or netting to create an appealing and functional backdrop



to your exhibit. This allows you the freedom to rearrange and change the exhibit without having to repair the walls.

Moveable Exhibits

Moveable exhibits often consist of panels connected to make a screen. These exhibits are free-standing and the panels may be interchangeable, allowing for exhibits to be moved and rearranged easily. The placement of panels can also help to direct visitors as they move through an exhibition.



there will be times when the exhibit is unsupervised, or if all areas cannot be monitored at once, take caution to secure display items.

If you wish to display valuable or fragile items that you do not want visitors to handle, they may be placed in a glass cabinet or behind a clear plastic or glass barrier. Various other barriers, such as a cord or fence, can also be used. Cabinet exhibits may be moved within an exhibition if small, locking wheels are attached.

Exhibition Panels

When planning and constructing display panels, it is important to standardize the panel size in order to maintain design consistency throughout the exhibition. Choose a manageable size (e.g., 80 cm wide by 100 cm high) for each panel. If larger panels are needed, you can work with multiples of your standard dimension (e.g., 160 cm wide by 100 cm high). Before making panels you should decide, using the plan of the exhibition space, how many panels you will need and how they will best fit into your exhibition space. Remember not to crowd the room; leave some wall space open.

Three-dimensional Exhibits

While wall exhibits and moveable exhibits are generally flat, exhibits can also be three-dimensional, including various objects, models, or ***dioramas*** (three-dimensional scenes in which figures are arranged naturalistically against a painted background). Artifacts relating to your exhibition theme can be attached to a panel or wall, propped alongside the display, or hung from the ceiling. Such three-dimensional exhibits may be small or very large and viewed from different sides. Consider security when planning your exhibit. If

Hands-on Exhibits

A three-dimensional exhibit on a tabletop enables visitors to interact easily with the display. Visitors may feel more inclined to pick up or touch objects on a table than on a wall. A sign saying, "please touch" can encourage the audience to become involved. (Objects may be secured with fishing wire, nylon thread, or string, if necessary.) If you want children to interact with the display, build a low table or provide a safe viewing step.

Hands-on exhibits can also take the form of games, puzzles, or other activities that encourage audience interaction. *For more information on interactive exhibits see "Enhancing your Exhibition," page 62 .*

Creating an Interactive Puzzle Exhibit

A puzzle designed by Elisabeth Winterwerb-Cossons for an interpretive center in Madagascar consists of pieces representing present day land-masses that visitors can fit together to reform the ancient super-continent of Gondwanaland. This learning game helps to explain the theory of plate tectonics. It can also be used to explore species endemism, or why certain species are native to a specific area and are found nowhere else.

To produce the Gondwanaland puzzle, cut out the forms of the present day continents from thick plywood (10 mm). It is advisable to prepare paper templates for the shapes first and to lay these on the wood to sketch cutting lines. Make sure that the shapes that you have drawn fit together. Keep the forms simple and try to achieve the appropriate size relationships among the continents. When cut, the wooden shapes can then be sanded smooth, painted, and varnished.

The exhibit may be placed on a tabletop or on the floor. Text and graphics explaining the different phases of the break-up of Gondwanaland should be exhibited nearby, along with instructions for using the puzzle.

Puzzles may also be produced with laminated pictures that visitors can place on a tabletop or attach to a cloth panel with velcro.

Exhibit Design

After you have identified the message and planned the space and type of exhibit you wish to develop, you are ready to design the contents of the exhibition. The elements of exhibit design include: choosing a color scheme; researching and creating illustrations; creating titles; writing text; choosing a text style; arranging illustrations and text on panels. As you develop each of these elements, it is vital to maintain a unified design style that runs throughout your exhibition. It is always best to devise a system for each of these elements using panel sketches and mock-ups before you start producing the real displays. A ***mock-up*** is a model or a drawing, generally made to scale, in preparation for making an actual exhibit.

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Use of Color and Texture

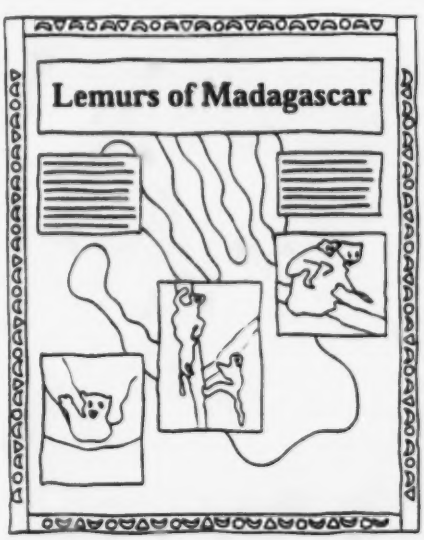
Color can help to unify an exhibition, enhance the portrayal of the message, and increase the exhibit's visual appeal. Colors contribute to the impact on your audience, the clarity of the information presented, and the overall harmony or ambiance of the exhibition.

It is advisable to use a neutral or pale color (cream or beige, preferably not white) for the walls of your exhibition room or area. Select a stronger main color to appear throughout the exhibition; one or two complementing shades of this main color can then be used for the panels, titles, texts, and illustrations. It is best to choose the colors while in the exhibition area in order to get an accurate idea of how they will look in the available lighting. *See Appendix 2A: "The Color Wheel" for more ideas about color combinations.*

There are no rules for devising a color scheme (a system or combination of colors) for your exhibition, as color preferences vary among individuals and cultures. However, it is important to investigate whether there are customs or taboos associated with certain colors or color combinations. Select colors that are appropriate for the objects that you will display or that are representative of the local people, culture, or environment. Some colors are associated with a particular topic, e.g., oranges and browns for an exhibition about the desert or greens for a forest display. Use the natural colors and textures of local materials such as tree bark, leaves, mats, and cloth to make your exhibition more appealing. Continue the color scheme and textures or design effects throughout your exhibition. Dramatic changes in color or style may make the exhibits seem disjointed and can take attention away from the message.

Techniques for Using Color and Texture to Enliven Your Exhibits

- Use designs, symbols, patterns, or animal tracks as decorations to represent the local area.
- Consider putting a large image, relating to the exhibition message, on the background of the display panel. For example, use a large leaf image behind text and photographs of trees or put a paw-print motif behind information on an animal. The image should be a pale shade so as not to detract from the text.
- Think about using colored letters for ornamentation or to distinguish text in different languages. A colored motif or shape behind your titles can highlight exhibition sections.
- For a visually pleasing and unified exhibition, use the same color paint or the same wood for the borders or frames of panels.
- A series of different colors or shades for frames can be used to highlight different themes or sections within a large exhibition.



Illustrations

Illustrations include photographs, maps, ink drawings, paintings, children's artwork, and wall or ceiling murals. Along with actual artifacts, they visually tell the story of your exhibition. Captions – brief text descriptions of visual images – may be used when needed to identify or clarify an illustration or when the information they provide will be of great interest to viewers.

While everyone enjoys illustrations, they are especially important if the level of audience literacy is low. In such cases, use illustrations that your target audience can interpret without text explanations. Select ways of graphically representing information that are familiar to your audience. If they are not accustomed to reading a graph or map, for example, these formats are best avoided. *For information on "Pilot-testing Visual Materials," see Appendix 1C: "Visual Media for Interpretation," page 40.*

Though the use of several different types of illustrations can make an exhibition interesting, it is important to organize these around the message and avoid using illustrations that are too different stylistically. Choosing one artist to provide illustrations helps to create a unified style. When possible, work with a local artist to design the exhibits in a style that is both visually pleasing and representative of the area. Provide the artist with a rough sketch of your ideas, then consider his or her recommendations. Make sure he or she is aware of any color or size constraints. If you are using a computer to generate graphics, remember that uniformity and simplicity are still important. While there are a wide variety of styles and colors available through computer graphics software, using too many different types at once can be distracting to viewers. *For information on "Making your Own Illustrations" see Appendix 1C: "Visual Media for Interpretation," page 39.*

Children's Artwork

Staff at the Ivoloina Education Center in eastern Madagascar combined school programs with exhibit design in an innovative way. They visited five upper-level elementary school classrooms and gave presentations on different ***biomes*** (major regional ecological communities) of Madagascar. Each class learned about a different biome, including what animals and plants are found there, what climatic or geographic characteristics help to define the biome, and what is unique about the biome compared with the rest of Madagascar and with other places in the world.

After the presentations, students were asked to draw what they liked best about the biome. They worked with a local artist to put all of their drawings together in one painting, framed by a shape they chose as a key feature of the biome. Paintings from each of the schools were displayed as part of a temporary exhibit on the ecosystems of Madagascar in the interpretive center. This colorful artwork was accompanied by text explaining how students participated in the exhibit design.

Exhibition Titles

Titles are the headlines for display boards and are used to subdivide the exhibition information. They attract visitors to an exhibit, briefly stating the message and encouraging them to take an interest in the information. Most people read the title first and some may read only the title.

Subtitles are visually less prominent than titles. Subtitles summarize the main ideas on a display panel and encourage the visitor to learn more. They are used to divide the images and text into manageable sections. Generally, no more than five subtitles should be used on a single display panel.

Effective titles and subtitles are **informative** and **relatively short; interesting** and **attractive;** and **complete sentences with active verbs.**

Writing Exhibition Text

Text is the written material in an exhibition. It supports the visual images and provides information in a clear and concise way. Following are some guidelines for developing good text:

Limit the amount of text information presented in the exhibit; keep it clear and concise

- Reduce each paragraph you would like to write to one informative sentence.
- Use short sentences (between 15 and 20 words).
- Divide up your text using subtitles, paragraphs, and bullet points.
- If you must use technical terms, be sure to explain them.

Make your message relevant and interesting for your audience

- Personalize the presentation of information by using pronouns or other identifying words (e.g., Have you ever seen a carnivorous plant? This young farmer is growing coffee between rows of shade trees).
- Use active verbs to make text more engaging.
- Use examples and analogies (*see box on page 55*).
- Make sure that each text section can be understood even if it is the only one your visitor reads.
- Tell visitors where they can get more information and provide a contact address.

Attractive Titles	Less Interesting Titles
Trees Breathe for You	Benefits of Trees
You Can Save Your Soil	Preventing Soil Erosion
The Forest is Your Pharmacy	Medicinal Plants
Our Lives Depend on Agriculture	Agriculture

(Ham 1992, 241.)

Test the text to make sure it conveys your message

- Ask other people to review what you have written. Reviewers who are not familiar with the topic can provide valuable insight into how visitors are likely to respond to new information.
- Always proofread your final text and have someone else check it, too.

Unless you are planning a temporary display or one that can be easily updated, avoid names, facts, or other information in the text that will become out-of-date quickly. An effective way to present dated information is to make a separate display panel or screen that can be used as a "notice board." Create a notice board using a mounting system that allows for flexibility. A fabric-covered panel with velcro attachments is ideal; other options are a cork board with pins or a metal sheet with magnets. A notice board can be used to present new data, interesting facts, and current events, or to present temporary exhibits highlighting current topics and local issues. In your main exhibition text, you can refer readers to the notice board. Though a notice board is designed to be changed easily, it should look professional and complement the basic design of your main exhibition (e.g., the same color scheme, title style, and type-face); this gives viewers a sense of continuity and helps to incorporate the notice board into the overall exhibition system.

Some Ideas for Examples and Analogies

- Focus on an individual object, plant, or animal. This provides a concrete illustration of the information you wish to convey. For example, focus on the path of a drop of water as it goes through the water cycle, or create a story about what happens to an animal when it is taken from its forest home.
- Introduce your exhibition with a local proverb or story.
- Use a hypothetical situation that your visitors can relate to or imagine. Describe what life on earth would be like if the average temperature increased by just 5°C.
- Exaggerate size to bring the viewer into the situation you are describing. For example, "If you were small enough to walk inside a wasp's nest, you would be amazed at what you would see!"

(Ham 1992, 10-11.)

Text Style and Size

Text can be most efficiently and professionally created using a computer. If you do not have access to a computer, you can use stencils, letrasets (letters you can rub onto the exhibit), or paint letters by hand. *See Appendix 2B: "Handmade Lettering."*

For your exhibition titles, text, and captions use a type-face, or font, that is clear and easy to read. Type-faces or fonts are classified according to the shape and form of the letters. Most type-faces fall into two categories: serif type (e.g., Times Roman), with bars or "feet" at the ends of each letter, and sans serif type (e.g., Helvetica) without bars or "feet." There are many serif and sans serif type-faces from which to choose.

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Here are some examples commonly used for display purposes:

Serif:
Times, Garamond, Bodoni

Sans Serif:
Helvetica, Univers, Futura

Some points to consider when selecting and using a type-face:

- Choose one simple, clear type-face, with a full range of letter forms (bold, extra bold, regular, italic) for the text and titles of your exhibits. Your selection should be based on the readability of the type-face and on the type style; choose a style that fits with your exhibition message.
- In general, it is advisable to use the same type-face throughout the exhibition for titles, subtitles, main text, and captions.
- In some cases, a different style may be appropriate for titles. Large initial letters or ornamental letters (in a different type-face or color) can also be used effectively to highlight titles, start paragraphs, or mark texts of a different language.

Ornamental type-faces for titles

BIODIVERSITY
Type-face: Tribe Outline

BIODIVERSITY
Type-face: Caustic Biomorph

Biodiversity Enriches Our Lives
Type-face: Mambo/Leawood

Initial letter to mark start of paragraph

We all depend on biodiversity, the variety of living things - from microscopic species to vast ecosystems. Biodiversity provides us with food, energy, fiber, and medicines. It is also important in our cultural expressions. Plants and animals are woven into our songs, dances, stories, and poetry. Biodiversity is used in our crafts and cooking, and celebrated in our festivals.

The size of the type-face for texts and titles will vary according to the dimensions of your display panels, the area of your exhibition space, and the distance at which the audience will stand to view panels (the viewing distance). If you change the size of a type-face, be careful not to alter the proportions of the letters because they will lose their clarity.

Exhibition text usually ranges in size from largest to smallest in the following order: titles, subtitles, main text, and captions. The table on the next page provides a guide to text sizes in relation to viewing distance. As a general rule, main text should never be less than 24 points (pt.).

96 pt.

72 pt.

48 pt.

24 pt.

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TEXT POINT-SIZE GUIDELINES

Viewing distance	Titles	Sub-titles	Main text	Captions
0 - 1.5 meters	No less than 72 pt.	No less than 48 pt.	No less than 24 pt.	No less than 18 pt.
1.5 - 2 meters	No less than 96 pt.	No less than 72 pt.	No less than 48 pt.	No less than 24 pt.

Use a combination of upper (capital) and lower (small) case letters for titles and text, as opposed to only upper case letters.

TEXT WRITTEN ONLY IN CAPITAL LETTERS IS HARD TO READ AND OFTEN LOOKS UNATTRACTIVE OR UNFRIENDLY. WARNING OR DANGER SIGNS ARE OFTEN IN ALL CAPITAL LETTERS.

Text spacing is important. Present text (both letters and words) in an uncrowded way. A general guide is to leave a space about the size of a capital 'M' between words, though this may vary depending on the amount of space you have and the type-face you are using. The amount of space between text lines also affects readability; widely-spaced text is easier to read than lines that are crowded together.

Do not crowd your letters.
Donotcrowdyourwords.
Crowded letters, words, or text lines may cause your reader to lose interest in the information because it is hard to read.

The length of a line of main text should be 30 cm (approximately 50-60 letters) or less. This makes it easier for the eye to find the beginning of the next line. Long lines and wide blocks of text are difficult to read.

(Ham 1992, 263-269.)

Arranging Illustrations and Text

To decide on the layout of your texts and illustrations on the panel or wall, make a ***mock-up*** first, either by sketching the arrangement or taping (or affixing) items gently in place before final attachment. You might devise a "grid system" for your display panels. This gives you a framework on which to base panel layouts and allows you to maintain a consistent style throughout the exhibition. (*An idea for a grid system is illustrated on page 58.*)

Principles of layout

Balance is the relationship of text and illustrations based on their visual "weight," or the visual attraction that one particular object has relative to another. For example, a large image may need to be balanced by two smaller images. However, a small, dark image may have equal weight with one that is larger, but lighter in tone. An asymmetrical layout is often preferable to a symmetrical one, which tends to look formal and static. Move objects around while the exhibition is in the mock-up stage to determine a balance that is visually appealing.

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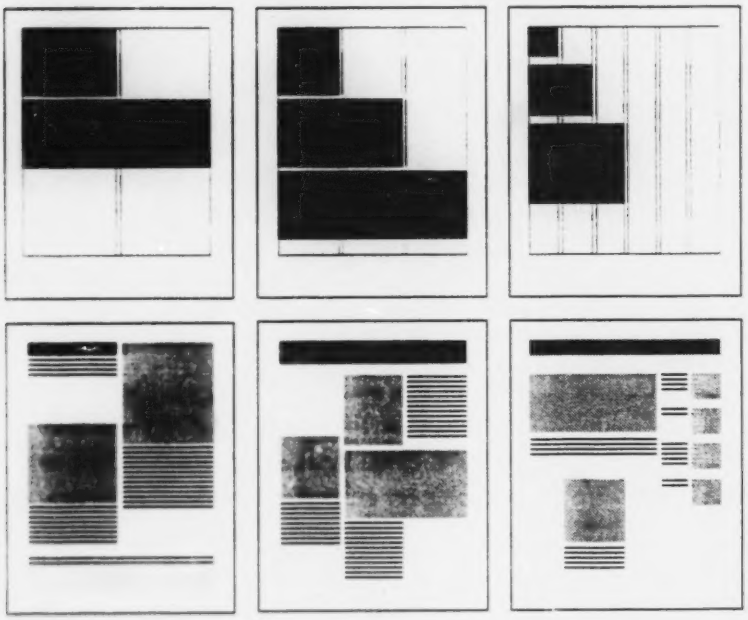


o Examples of grid systems and panel layouts
Grid systems are used as a background guide to assist with the arrangement of titles, text, and illustrations on display panels. They are made by dividing each panel space into measured columns (upper row of diagram). Texts and pictures are then positioned within this scheme fitting in one column or stretching across several (lower row of diagram). Using one grid system throughout an exhibition gives unity to your display panels and helps to develop a consistency of design style.

Although grids serve as useful guides for developing exhibitions, they must not be followed too strictly. Creativity is the key to designing display layouts.

"White," or empty, space on an exhibit is as important as text and illustrations. Leaving space around or between text and images is essential. A crowded panel can overwhelm viewers, making them less likely to take an interest in the information.

Images can be used to direct the eye of a viewer toward the text. For example, a graphic of a bird mounted so that it appears to fly toward the center of the exhibit helps focus attention on information presented.

Arrangements of text and illustrations should have a starting point that the audience can locate easily. It may help to follow the same direction that viewers use for reading. Many people read from left to right, and naturally look at the upper left side of an exhibit panel first, then read across.

Items that are most important on your exhibit should be highlighted. Use differences in size, shape, color, or angle to give emphasis to important items. **Isolation** – setting text or an image apart – can also be used to attract or direct attention.

Display text and illustrations by choosing a **background color** that does not dominate them. Pale or neutral shades usually make the most appropriate backgrounds. Think carefully before using black (as it is very dominant) and if possible, avoid white (as images tend to get "lost" on a white background).

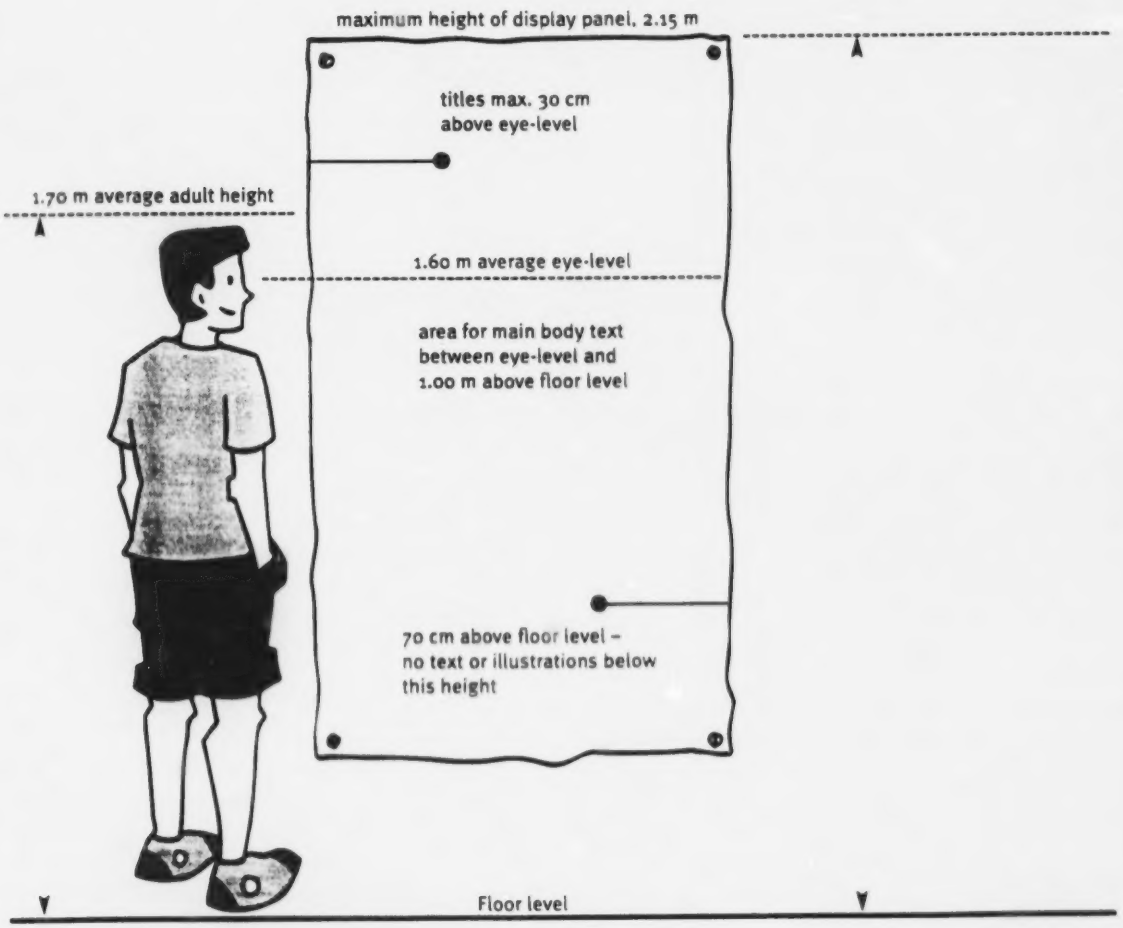
Place texts and titles at a height where they are easy to read. Consider the average height

and **"eye-level"** of the target audience for your exhibit. For exhibits primarily targeting children, you will need to place the text at a lower level. In general, the following guidelines apply:

- Think about the eye-level of your audience. For example, where average adult height is 1.70 m, eye-level is approximately 1.60 m from the floor.
- Titles should be about 30 cm above eye-level.
- Main text should be between eye-level and 1 m above the floor.
- No written or visual material should be displayed lower than 70 cm (measured from floor level).
- The height for the top of the display board or case should be no more than 2.15 m.

(Ham 1992, 268.)

Text and illustrations that are mounted outside of this recommended range should be placed at an angle for easier viewing.

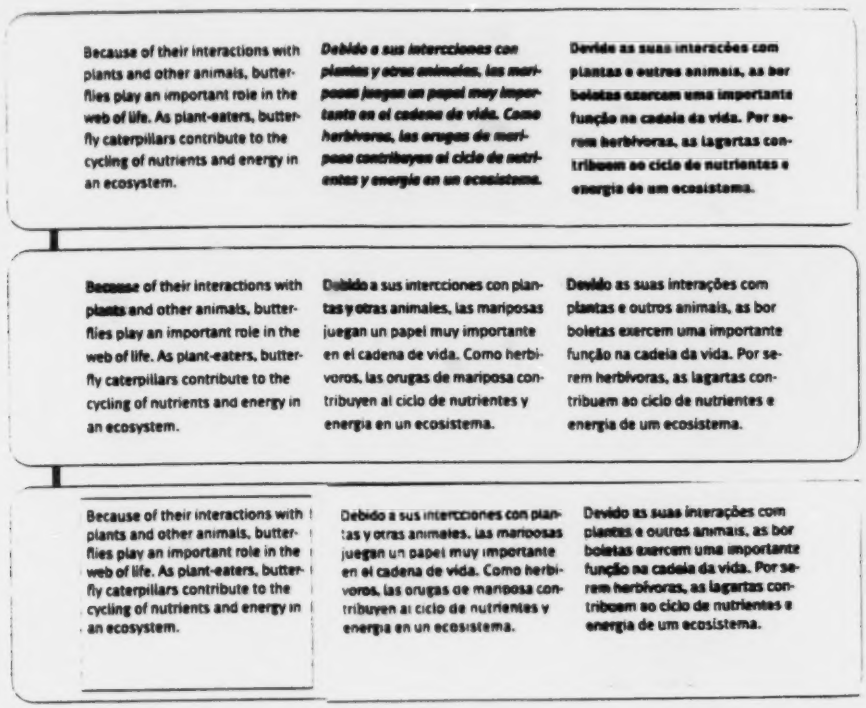

maximum height of display panel, 2.15 m
titles max. 30 cm
above eye-level
1.70 m average adult height
1.60 m average eye-level
area for main body text
between eye-level and
1.00 m above floor level
70 cm above floor level –
no text or illustrations below
this height
Floor level

Options for Displaying Several Languages

Different type-faces or type styles

Different symbols

Different background colors or shades


Because of their interactions with plants and other animals, butterflies play an important role in the web of life. As plant-eaters, butterfly caterpillars contribute to the cycling of nutrients and energy in an ecosystem.
Debido a sus intercciones con plantas y otras animales, las mariposas juegan un papel muy importante en el cadena de vida. Como herbivoros, las orugas de mariposa contribuyen al ciclo de nutrientes y energia en un ecosistema.
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Using More Than One Language in Exhibits

Often interpretive centers receive visitors who speak various languages. For example, in China the majority of visitors to interpretive centers are likely to speak Mandarin, Cantonese, or English. In order to accommodate this, some interpretive centers include multiple languages in their exhibit text.

Choose a consistent system for presenting multiple languages. Visitors should be able to recognize their language easily on a display board and to follow the appropriate text throughout the exhibition. Different languages can be distinguished by the type-face, style (e.g., italic or bold), text line spacing, text or background color, or by using a symbolic key. Often the language most commonly spoken by the audience or the national language of the country is put in the first position on each panel, followed by other languages in a consistent order. The primary language(s) may be placed on wall displays with additional languages in a notebook on a table below the panel. Alternatively, text in different languages can be displayed on different sides of a three-dimensional exhibit.

In many parts of the world, numerous, distinct languages or dialects are spoken. To incorporate more than two or three of these in an exhibition is not practical. In such cases, the language(s) for exhibit text should be selected according to the needs of the interpretive center's target audiences. Tours or written materials can be offered in other languages. Brochures may be developed in languages commonly spoken by foreign visitors.

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Piloting-testing Exhibits

While designing exhibits and drafting text, test ideas with potential audiences to find out if information, vocabulary, and directions are expressed appropriately. This will help identify where specific themes or topics should be expanded, the message refined, and text edited for clarity. When you have arranged text and images on a display panel, find out how people respond to them in this form; this is important as actual displays will look different from sketches and drafts on paper. Pilot-testing can assist you in designing exhibitions to meet visitors' physical needs: Is text at the correct height? Does the arrangement of panels allow for easy circulation through the exhibition? Are there potential hazards such as sharp corners or other things that children might run into?

Checklist for Visitors' Reactions to Exhibit Mock-ups

- Do they like it?
- Do they understand it?
- Does their understanding match the communication objectives that were initially established for the exhibit?
- Does the exhibit give the viewer a sense of discovery?
- Do visitors have difficulty with terms as they are used in the exhibit text?

Once an exhibit is open, you will want to record and evaluate visitors' experiences in the context of the whole exhibition. Such an evaluation provides an overall assessment of the aspects of the exhibition in need of improvement. Allow for some changes in exhibit design based on visitors' reactions once you open to the public.

(Serrell 1996, 141-146.)

Unit 5: "The Evaluation Process," contains more information about evaluating interpretive programs, including exhibits.

Assembling Exhibits

- Wash your hands before working with any of the exhibit materials in order to prevent the transfer of oils, dirt, or fingerprints.
- When cutting illustrations and text blocks to size, use a sharp knife or scalpel and a metal ruler as a guide. It is difficult to cut a straight line with scissors and they may leave edge marks.
- Leave a wide margin of paper around the text; 1.5 cm or more is a good guideline.
- When cutting or mounting text or illustrations, make the top and side margins equal, but always leave a slightly deeper margin at the bottom. This gives balance to both pictures and text.
- For cutting and trimming corners, use a T-square or some object with a right angle.
- Use glue that spreads evenly and does not leave bumps, such as glue in a spray can (spray glues come in varieties that are either permanent or allow materials to be repositioned). A small amount of glue on the back corners of a display item is generally enough. After applying glue, smooth the front surface with a roller.

- "Velcro" tape is versatile and allows for easy mounting of illustrations and text onto walls or panels.
- To create depth and visual interest within the exhibit, illustrations and text may be mounted on cardboard of varying thicknesses before attaching them to a display panel.
- Lamination, or plastic coating, is a practical and cost-effective way to protect texts and illustrations. Lamination works best on lightweight card stock; heavy card stock tends to laminate poorly, creating bubbles and creases in the plastic coating. (Laminating can be done at a print or photocopying shop. Portable laminating machines also provide a high quality result, although they are not usually suitable for laminating photographs.)

While this unit provides an overview of the process of exhibit design that you can carry out with a relatively small budget and limited resources, these are not the only methods of exhibit production that are available. In many countries, particularly in large cities, there may be professional exhibit, or graphic, designers. Working with a professional may be more costly than designing and assembling exhibits yourself, but it is an investment in high quality, durable exhibits. It is worthwhile to research the professional resources that are available in your area to determine whether this approach is appropriate for your interpretive center. Ask for advice at other non-formal education centers, a graphic design agency, or at a display and poster printshop. *See also Appendix 2C: "Professional Exhibit Production."*

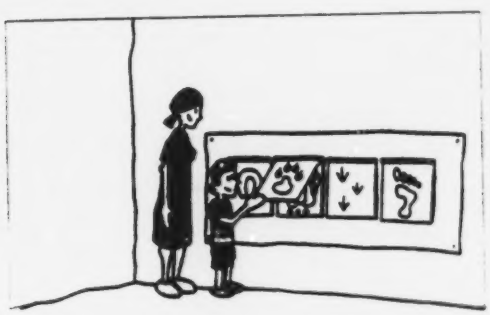
Enhancing Your Exhibition

A children's play area, picnic benches, or display boards located at the entrance to your interpretive center, or a brightly colored motif painted on the center's exterior can help to attract visitors.

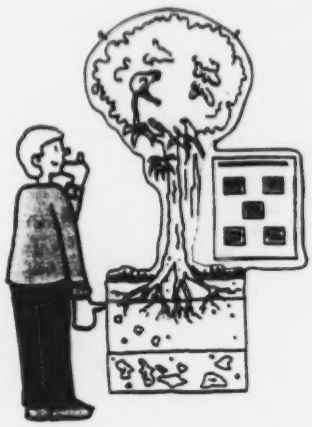
Inside the center, include three-dimensional objects, real artifacts, models, dioramas, and interactive games. Allow visitors to touch and handle these objects when possible; if specimens are very fragile they may have to be exhibited in a glass display case. Consider how exhibit design can encourage visitor interaction. Enable visitors to do something, such as opening, turning, or otherwise manipulating parts of a display. When visitors physically

manipulate objects or actively respond to questions or ideas presented, they are more likely to retain information. Below are examples of some interactive techniques you can use:

- Pose questions in the exhibit and provide answers that visitors may discover by lifting a flap.
- Develop activities with puzzles, games, drawing, costumes, puppetry, or microscopes that complement the exhibition. These may be adjacent to the exhibit or part of an "activity station" that is set apart, such as an alcove with a table and chairs, providing materials that visitors can use to further explore issues presented in the exhibition.



- Create a revolving wheel display with windows. By turning an arrow on the wheel the visitor can point to various illustrations. When the arrow points to an image, a related message or question will appear in the reading window at the base of the arrow. (For an example of a revolving wheel exhibit and how to assemble it, see Brace et al. 1982, 69 – 75.)
- Invite visitors to touch and handle objects that are not fragile with a "Please touch" sign, or make a "touch and feel box." The latter is a covered box containing natural objects (e.g., feathers, coral, seeds, or tree bark). Visitors put their hands through openings in the box to feel the textures of the different objects and then guess what they are touching. Answers are revealed either by opening lids in the box or by lifting an answer flap nearby.



- *Display boards of different shapes add variety to your exhibition.*

- Include a "What can you do?" panel that provides some examples of what visitors can do themselves to conserve biodiversity and to improve their environment by making small changes in their everyday lives.
- A brochure or leaflet can provide guidance for visitors to your interpretive center or to an adjacent nature trail *(see page 69)*.
- Provide a guest book, suggestion box, or chalk board for visitors to ask questions, make comments, and leave their address or other means of contact. Be sure to follow-up on any questions.
- Display local handicrafts or children's artwork as a way of encouraging local participation and educating tourists about the region and the people who live there.
- If possible, use video programs, audio devices, or computers to show information. A slide projector may be used to present a program that automatically repeats.

Outdoor Exhibits

A variety of exhibits may be constructed on the interpretive center grounds, including: outdoor information panels, murals on exterior walls, botanic gardens, endemic plant nurseries, trails, or wildlife observation areas.

Live Animal and Plant Exhibits

Are you considering live exhibits for your interpretive center? While visitors will hopefully be able to view wildlife in its natural habitat, an interpretive center may also display a small selection of live animals and plants for closer observation. While plants may be easier to care for than animals, the decision to include any live exhibits is one that should not be taken lightly. It is essential to weigh the potential educational benefits with practical and ethical issues.

Plants and animals should not be collected from the wild. In many cases, it is illegal to do so. Make sure you consult with a local zoo or other authorities about regulations. Even displaying organisms that are domestically bred or acquired through a wildlife confiscation or recovery program may encourage visitors to collect wild plants and animals to keep at home. It is essential to address this issue at your center.

Research the type of care that will be required. Questions you should ask include:

- What are the dietary needs of the animal?
- What kind of conditions are necessary for a plant or animal to survive and grow (e.g., temperature, moisture, light)?
- How will you be able to maintain the enclosures for plants or animals?
- Will animals or plants be subjected to increased risk of disease due to proximity to humans?

Consider the safety of visitors, as well as that of plants and animals on display. You may need to think about purchasing insurance against accidents or injuries. Limit the number of live plants or animals so that you can manage them and they do not take visitors' attention away from the rest of your center's exhibition. If you are satisfied that live plant or animal exhibits are a good educational option, and you can make the commitment to properly care for them, make selections that will best illustrate concepts you want to teach.

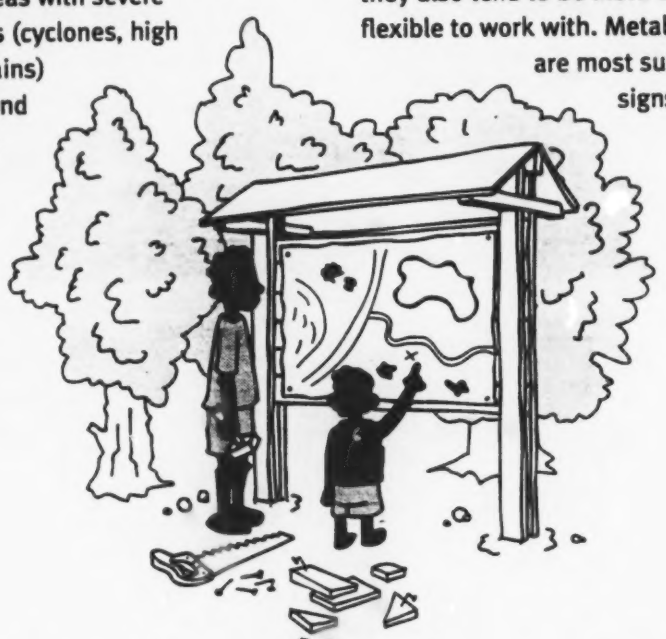
Organisms that are familiar to your visitors, such as a spider, fish, or frog, can be used to demonstrate important concepts of life cycles and habitat requirements. Design a checklist of physical features or behaviors that visitors can observe and record. (Brace et al. 1977 provide an overview of materials and techniques for collecting specimens, and how to construct an aquarium, terrarium, cage, or other home for live animals.)

Though the components of planning and design are similar for indoor and outdoor exhibits, outdoor areas have different space considerations and exhibits must be planned to withstand weather conditions. When choosing the location for an outdoor exhibit or sign, try to make the most of the qualities of the setting (while causing as little disturbance as possible), particularly where nature provides a real illustration of a message or concept you wish to convey.

You will also need to assess the position and exposure of the site for your outdoor exhibit. In which direction does it face? Is it on high ground or in a sheltered valley? Try to select a location that has some natural shade and wind protection. An inexpensive shelter can be constructed over an outdoor sign or display to shield it from rain or direct sunlight which may cause colors to fade. This shelter should be strong enough to withstand wind and weather. In areas with severe weather conditions (cyclones, high winds, monsoon rains) wooden displays and signs can be hung from a fixed wooden or metal frame using metal hooks and rings on all sides of the panel. When a storm is forecast, the panel can be removed easily and brought inside.

In most areas outdoor exhibits can be effectively and economically constructed from wood. Consider using wood from a native tree species that is naturally resistant to decay. Be sure that the wood you select is not from a rare or endangered species. It is advisable to coat wooden structures with a wood preservative or clear varnish for greater resistance to moisture and protection from weather (boat or marine varnish is effective and inexpensive). However, take care when using chemicals that may be harmful to you or the environment (avoid using these if possible).

As an alternative to wood, sheet metal, cement, or stone can be used to construct outdoor exhibits. Although these materials are more resistant to wind and weather than wood, they also tend to be more expensive and less flexible to work with. Metal, cement, and stone are most suitable for outdoor signs that are designed



62

to be permanent (e.g., the entrance sign for the interpretive center, markers on a nature trail). *For more information on constructing outdoor signs and exhibits, see Appendix 2D: "Making Outdoor Signs and Displays."* It is important to establish a maintenance schedule to ensure that outdoor exhibits are clean, free of mold, legible, and in good condition overall.

Demonstration Areas

An interpretive center is an ideal place to demonstrate ways in which local people can improve their environment and reduce habitat degradation and loss of biodiversity. Demonstration areas such as gardens and nurseries provide practical examples and reinforce information presented at the interpretive center. They can help to encourage positive attitudes toward environmental protection and conservation, and play a critical role in solving urgent local ecological problems. Some ideas for demonstration areas include:

- Propagation of plants for use in restoration or reforestation projects.
- Demonstration of new crop species and sustainable agriculture techniques (e.g., soil conservation, irrigation). Visitors can learn about these methods and apply them to improve their environment, raise crop productivity, and make effective use of natural resources.
- Fish ponds to demonstrate productive aquaculture techniques.
- Demonstration of native plant species (those that are natural to an area) that will attract desirable butterflies, bees, or birds; or a medicinal plant garden.
- Erosion control demonstration showing a plot seeded with native, non-invasive plants that stabilize soil. (Invasive plants spread rapidly and can exclude other plants, damaging natural areas and altering ecosystems.)

Contact a botanist, wildlife manager, or horticulturist for more information on these types of demonstration areas.

Selecting Themes for Demonstration Areas

Do your research and ask questions, like:

- How do local people currently support themselves: forestry, fishing, agriculture?
- Consult with local agencies or community members to identify conservation problems in the region. What techniques can you demonstrate to address these problems?
- Hold meetings or workshops to discuss conservation techniques that people would like to learn about.
- Examine the local economy. Can people afford the materials to apply the techniques demonstrated?
- Look for community members who are already employing some alternative farming or fishing methods and who might be willing to demonstrate their techniques or try new things as an example for others.

Nature Trails

A nature trail is a planned walkway or path through a natural area, organized around interesting and important natural features. The objectives for designing a nature trail should be based on education, interpretation, and conservation. In planning a nature trail, the following steps are important:

- Visit the area several times and make a list of interesting features.
- Consider the educational information that you want to provide for visitors as they follow the trail.
- Think about environmental concerns. How can people move along a trail with minimal disturbance to the environment?
- Consider visitors' interests by identifying unique and beautiful places, while also thinking about visitors' comfort and safety. While a scenic view is desirable, select stops well away from steep drops. Is the stop shaded or in the sun? Are stops safe in all weather and seasons?
- Think about access along the trail for people with special needs. Perhaps two routes can be designed and marked – a gentler, shorter one and a longer, more demanding route.

Generally, a nature trail:

- Is **short,** requiring 20 minutes to one hour to walk the trail including time for stops.
- Forms a **loop** to avoid retracing steps when returning to the starting point.
- Is **clearly marked** so visitors can follow the trail easily.
- Is **clean,** having as little evidence as possible of previous visitors.
- Is **constructed to minimize erosion** and has effective **drainage** (*see graphic on page 68.*)
- Is **well maintained;** fallen trees are removed from the trail and damage by weather or vandals is repaired.
- Is designed and managed for **minimal ecological impact** (e.g., natural leaf litter is left on dirt trails, trails are made only as wide as is necessary for access).

Both practical considerations and creativity are key in trail planning; make use of unique vegetative and geological features. The trail itself should be in harmony with the landscape, following the natural contour of the land.

Respect sensitive habitats and consider soil types in order to prevent excessive erosion. *See "Wildlife Viewing Structures," page 71 for alternative ways for visitors to explore sensitive habitats.* The number of visitors who use the trail is another important factor to consider. It is a good idea to have visitors and hikers register (either in a notebook at the interpretive center or at the start of the trail) in order to monitor trail use.

Trail Construction Materials

Nature trails may be constructed from a variety of materials. Your choice of material may depend on location, trail usage, and available resources. Some choices are:

- Asphalt and concrete: for heavily-used trails and for accommodating people with limited mobility (e.g., those using a wheelchair or cane); expensive, but require relatively little maintenance
- Paving stones and gravel: also practical for heavy use
- Woodchips or bark: for moderate use; blends well in a forested environment
- Soil or grass: for trails with low, seasonal use

Try to make trails as natural as possible – avoid materials that change natural run-off and drainage patterns. A bridge or elevated walkway may be a necessary alternative in fragile or swampy areas.

On steep slopes, rocks or logs can be used to form steps to anchor the soil and make the climb easier
Trees and rocks form a natural barrier to shortcutting
Turns should be wider and flatter than the rest of the trail
NATURE-TRAIL
A log or rock bar across the trail helps reduce erosion
45°

(Adapted from Trapp et al 1994, 82.)

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Signs and Brochures

Signs and brochures can provide interesting information for visitors as they walk along a nature trail at their own pace. They are also relatively simple, but effective alternatives if you do not have the staff or the time to provide a guided tour. Designing signs or brochures should be part of the initial trail planning. Visit the area or walk the trail several times in order to develop a theme for trail signs or a brochure that is appropriate for your audience. For example, if the trail will be utilized primarily by tourists, select a theme that will have significance for them. Consider the advantages of using interpretive signs or a brochure; while signs can be a physical imposition on a site, visitors may prefer them to following along with a brochure.

Many of the same techniques used for developing a guided interpretive walk apply to writing text for interpretive signs and brochures. *See Unit 3: "Interpretive Presentations."* Introduce your message in a way that captures the attention of visitors. Incorporate questions that involve visitors in a process of discovery as they explore the exhibit or natural area. You might pose a question at one spot and answer it on a subsequent sign. The same method may be used in a brochure keyed to numbered markers.

Pilot-test brochure or sign text with visitors and revise it until you are satisfied that it meets your objectives. Accompany a group of willing visitors around the exhibit area or along the trail as they read worksheets or temporary paper signs with draft text.

Continue to observe visitor behavior after you have erected signs or printed the brochure. Do visitors read the text or only look at the pictures in the brochure? Do they make the stops on the trail and read the sign or relevant infor-

mation in the brochure? Are there any problems at the stops that you did not anticipate (visitors having trouble locating the features you wish to highlight, insects or poisonous plants becoming a nuisance, visitors contributing to erosion or otherwise degrading the site)? Make notes of any changes you wish to make to the brochure or to the location of stops along the trail. Make periodic checks to see if signs need to be repaired or replaced. *For more information on evaluating interpretive activities, see Unit 5: "The Evaluation Process."*

Trail Signs

Signs along nature trails indicate and interpret natural features, as well as provide information or warnings. Signs should be visible while not marring the natural landscape.

Signs:

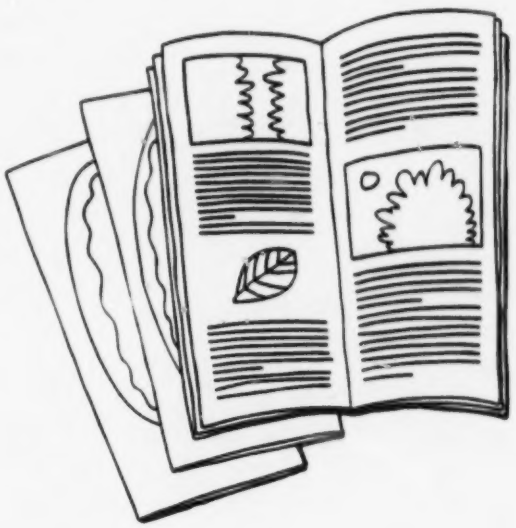
- Inform (give directions, tell distances, identify facilities)
- Interpret (name and explain natural features and their significance)
- Notify (state regulations or warnings)

(Brace 1977, 283.)

Use materials for signs and their supports that come from the region, such as wood, bamboo, or stone. As with exhibits of any kind, keep a consistent style and lettering for all of the signs. Protect signs from rain, humidity, or sun by treating them with a varnish. *For further information on the construction of outdoor signs, see Appendix 2D: "Making Outdoor Signs and Displays."*

Self-guiding Brochures

Brochures may be made available at your center or in a weather-proof box at the beginning of a trail. Charging a small fee can help cover costs of materials and printing. Visitors may appreciate having a brochure to take home as a souvenir. For visitors who do not wish to keep the brochure, provide a box where brochures can be returned for reuse or to be recycled. Consider ways to adapt the brochure or offer different versions for tourists and school groups, as well as the possibility of translating the text into different languages.



Brochure Design

To design a brochure, booklet, or leaflet, follow the guidelines for exhibit design: balance illustrations and text, consider color and type-faces, and convey information in a simple and interesting way. In addition, the following points are important for designing an effective brochure that is practical to produce and use:

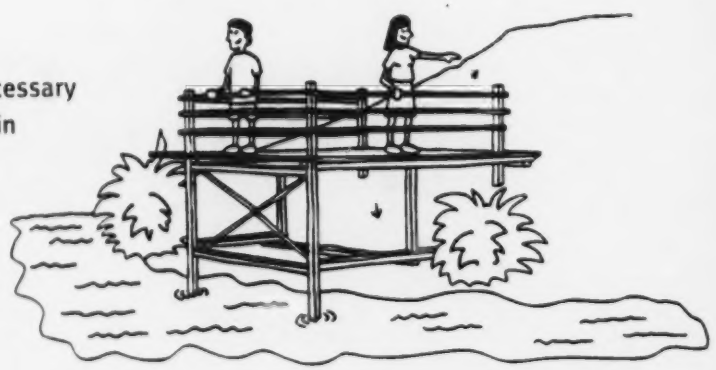
- Consider your available budget and the number of copies of the brochure that you wish to produce. Research the costs of printing and compare these to photocopying. Printed brochures tend to look more professional and offer more possibilities in terms of design, color, paper type, and brochure size.
- Find out if a local firm or civic group is willing to fund the production of a brochure.
- Try to link brochure design to the style used in your exhibits; use of similar colors and motifs contributes to a consistent look throughout your entire interpretive project.
- If you are planning to photocopy the brochure, select illustrations such as line art (black and white drawings) that reproduce well.
- Select a size for your brochure that is convenient for visitors to use. Think about how it will be formatted and folded. There are also a number of choices for paper in terms of color, texture, and recycled content.
- Include a simple map of the exhibit area or trail to orient visitors and guide them in their exploration.
- Consider including an address in the brochure so visitors can contact you if they would like further information or would like to make a donation to your project.

Wildlife Viewing Structures

Wildlife viewing structures may be necessary for viewing wildlife in fragile habitats or in difficult terrain. They allow visitors to observe comfortably and safely without disturbing wildlife or vegetation. Some types of viewing structures include:

- A **boardwalk** traverses a habitat that is sensitive or would otherwise be difficult to cross on foot, such as wetlands or dunes.
- A **platform** extends out over similar habitats, serving as an observation deck or look-out.
- A **blind or hide** is a structure that allows people to observe wildlife through a window or slit without being obtrusive or alarming wildlife with their movements. Blinds serve to protect both wildlife and viewers.
- A **tower** provides a high vantage point from which visitors can view wildlife at a distance. Like a blind, a tower provides for the safety of visitors by separating them from wildlife below. Towers can be very intrusive on the landscape, but are a necessity in some cases.

To construct wildlife viewing structures, use materials that complement the landscape and that are compatible with the natural environment. There are a wide variety of designs for these structures. If possible, consult with an outside contractor who has experience in designing these facilities.



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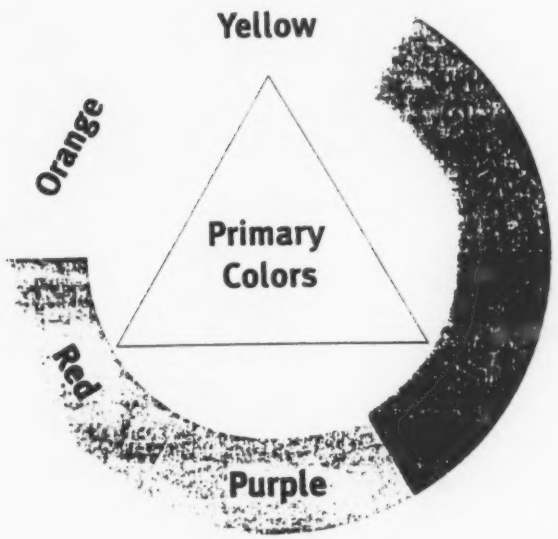
Appendix 2A The Color Wheel

The **color wheel** shows the relationship of colors to one another. For exhibit design it is useful to have a basic knowledge of colors and their effects. Here are some important points:

- The **primary colors** are red, blue, and yellow.
- The **secondary colors** are colors that can be mixed from just two of the primary colors (e.g., blue and yellow make green).
- **Advancing colors** are generally dark colors; they stand out and dominate.
- **Retreating colors** are less prominent, pale colors.
- **Warm colors** such as vivid reds, oranges, and yellows take on more importance and are prominent.
- **Cool colors** such as blues, greens, and violets recede and have a calming effect.
- **Complementary colors** appear opposite each other on the wheel (e.g., orange and blue, green and red, yellow and purple).
- **Related colors** are adjacent to each other on the wheel (e.g., yellow and orange, blue and purple). They are similar (warm and warm, or cool and cool colors) and blend easily.
- **Neutral colors** can be used alongside any other color. Black and white are neutral colors.
- A **dark color** stands out on a pale background. A **pale color** stands out on a dark background.



Appendix 2B Handmade Lettering

Carbon Paper Transfer

An effective way to make titles and labels for display panels is to use carbon paper. The carbon paper allows you to transfer the outline of title letters from printed paper to the panel. The outline then serves as a painting guide. In order to use this technique, you must have access to a computer and printer.

Method

1. Print out the title on paper in the size required for the panel.
2. Position and tape the paper printout on the panel in the location where you want the painted letters.
3. Slip carbon paper between the printout and the panel.
4. Trace over the outlines of the letters with a ball-point pen; use a ruler for letters with straight edges.
5. Remove the carbon paper and printout from the panel.
6. Paint the letters using the carbon outline as a guide.
7. When paint is dry remove excess carbon from the panel with an ordinary eraser.
   Note: On some display surfaces it is difficult to remove excess carbon after painting and a blue tinge may be left on the display panel around the title letters. Always test carbon paper first before using this technique. Leave the carbon on the panel for at least 24 hours and then try to remove it with the eraser.

Stenciling

If carbon paper is not available or the panel surface is too rough to use carbon paper, you can create stencils for title letters. For this method you will need a computer printout of the letters and a fine, sharp knife.

Method

1. Print out the title on paper in the size required for the panel.
2. Place the printout on cardboard, a wooden board, or a plastic cutting mat.
3. Carefully cut out the letters, leaving the paper intact to form a stencil.
4. Tape the stencil in place on the panel.
5. Using a pencil, trace the edges of the letters onto the panel.
6. Remove the stencil from the panel.
7. Paint letters using the pencil outlines as a guide.
8. When the paint is dry, remove pencil marks from the panel with an eraser.

Appendix 2C Professional Exhibit Production

Graphic Design Studios and Advertising Agencies

A graphic design studio or advertising agency can offer you complete exhibit development service, including:

- Consultation about your wishes, needs, and design preferences
- Professional advice on the appropriate display printing technique for your exhibition
- Development of layout designs for display panels incorporating artwork, photographs, and text
- Preparation of designs for printing, and organization of commercial printing at a display and poster printshop
- Delivery of finished exhibits

To produce displays at a graphic design studio or advertising agency, you need to supply finished exhibition text, with titles and captions, and a selection of the photographs, slides and artwork to be used in your exhibition. Be as clear as possible about your exhibition needs and expectations, and if possible, provide rough layout sketches for discussion.

Design studios and advertising agencies undertake most of their design projects on desktop computers working with layout, illustration, and image retouching software.

Photographic and artwork images are scanned into the computer for incorporation in designs, and black and white or color printers provide layout examples for the client. A studio or agency will be able to offer you a wide variety of modern and classic type-faces from which to choose. They can also design and arrange the production of exhibition leaflets, brochures, information sheets, or nature trail guides for your interpretive center.

Producing Display Designs Using a Computer

It is possible to produce designs for display panels yourself using a computer. Several design softwares are available; some common ones are:

- "QuarkXPress," "PageMaker" (layout softwares)
- "Freehand," "Illustrator," "Coreldraw" (drawing softwares)
- "Photoshop" (an photo design and image retouching software)

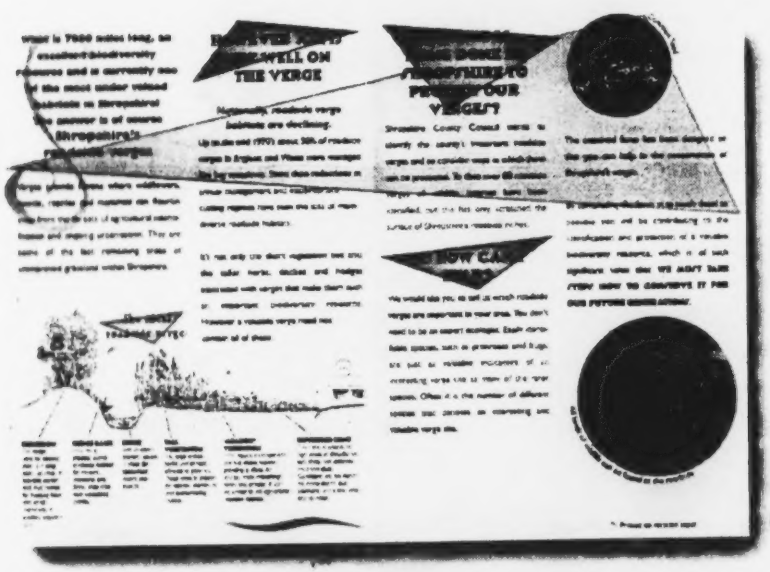
The design capabilities of these packages vary. A computer or software dealer will be able to advise you about which software is appropriate to your needs. When developing displays on a computer, follow the basic design guidelines presented in this unit.

Computers offer the possibility of creating a variety of visual effects which can be useful and exciting presentation tools if handled sensitively (e.g., color blends, color gradients, cut-out shapes and images, drop shadows, textured backgrounds). However, too many computer-produced "effects" can make a display look crowded and confusing. Avoid distorting type-faces; altering the proportions of the letters disturbs the aesthetics and balance of the type and can make texts difficult to read.

You can print out computer designs yourself on a color or black and white paper printer. If you have a scanner you can incorporate photographs and artwork, via the computer, directly into your display designs. A computer dealer will be able to give you advice about which scanner or printer to buy. They can also inform you about the associated scanning and printing software and give instruction for setting up your equipment.

If you do not have a scanner, you can mount photographs or illustrations on to your display designs after they have been printed. In most cases it is advisable to laminate computer designs in plastic to protect them before attaching them to display panels or exhibits. Alternatively, you can use plexiglass ("perspex") as a cover for printed text or photos. Plexiglass should be cut to size and the edges smoothed, before it is screwed in place over the display panel.

An alternative to printing your own computer designs is to take your layout, as a paper printout, or on a diskette or CD-ROM to a professional graphic design studio or advertising agency. They will be able to develop your ideas further and produce commercially printed display panels, using silk screen or ink-jet printing, as described below. If you plan to give computer data to a design studio or advertising agency, it is important to check beforehand that your computer platform and software are compatible with theirs.



A leaflet with too many computer-produced graphic "effects"

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Commercial Printing Techniques

Two commercial printing techniques commonly used for exhibits are silk screen printing and ink-jet poster printing. Ink-jet prints are usually produced on large format paper and then mounted on a rigid panel, while silk screen prints are printed directly onto the panel itself. The following are some materials commonly used for mounting and direct printing:

- "Forex," or PVC hard-foam plastic is a white colored material that comes in a range of thicknesses from 2 mm to 10 mm. It is a durable substance that is ideal for permanent exhibitions or traveling displays.
- Light foam plastic is a softer, lighter, and more flexible material than "Forex." It is often used to produce cut-out shapes for exhibits, as well as for signs, hanging displays, and temporary exhibits.
- "Alucubond" or aluminum-covered plastic is a material that is either white or has a metallic aluminum finish. It is more expensive than "Forex," but is very durable and therefore suitable for outdoor exhibitions.
- Plywood consists of multiple sheets of wood glued together. It is available in thicknesses from 4 mm to 10 mm. Depending on the glue used, plywood may be water resistant. The hardness, structure, and color of plywood are the result of the type of wood used in its production.
- Particle board is made from pressed and bonded chips of wood and is available in thicknesses of 4 mm and upward. It is an inexpensive material for display panels, but as it is heavy, it is most suitable for permanent exhibitions.

Ink-jet and silk screen prints can also be made directly on fabric, polythene, or heavy duty plastic. This provides an interesting and unusual visual effect and is ideal for creating both permanent stationary exhibits and traveling exhibits. For presentation, fabric display panels can be stretched across a frame or between posts, or suspended on wires from the ceiling with counter-weights or floor attachments to keep them taut.

Silk Screening

Silk screening is a versatile printing method by which designs can be printed directly on almost any material with a relatively smooth surface (e.g., hard plastic, perspex, glass, wood, porcelain, stone, a wide range of fabrics). Silk screen prints are ideal for creating outdoor exhibits. Waterproof and ultra-violet light resistant inks can be used so that colors on the display boards will not fade with exposure to sunlight or water. To make a silk screen print, the finished computer layout or display panel design must first be reproduced on a film sheet. A film sheet is a piece of thin light-sensitive plastic that carries an identical photographic image of the design. The film sheet is used by the printer as a template for the production of the final silk screen print. A separate film sheet is needed for every display panel design and for every color used.

Ink-jet Printing

Ink-jet printing is cheaper than silk screen printing as no film sheets are required. However, this method is limited to use with materials that can pass through a printer.

Paper (which is then mounted on a rigid panel substrate), fabric, polythene, or heavy-duty plastic are the materials most commonly used. Display panels produced using ink-jet are ideal for indoor exhibitions. For use outside, designs must be printed with ultra-violet light resistant inks and panels must be coated in clear plastic. Even so, ink-jet print colors deteriorate relatively rapidly when exposed to sunlight and water, and are only guaranteed against fading for one year. Ink-jet printing is a relatively new printing process and technology is advancing rapidly. Prints with greater weather resistant capacities are currently in development.

Exhibition Mounting Systems

For the presentation of display panels, artifacts, models, and dioramas professional exhibition mounting systems are available. Such systems can be relatively permanent or easily transportable. They are often made from light aluminium tubing and have "click and snap" joints allowing them to be assembled and disassembled quickly without the use of tools. Most exhibition mounting systems consist of component parts that can be purchased as a set or separately. This enables the user to create a wide range of exhibition layouts and to extend and develop the system over time. Accessories, such as shelves, brochure dispensers, tables, and light systems, can also be integrated into the mounting system.

Appendix 2D Making Outdoor Signs and Displays

Wooden Signs and Displays

- Select high quality, sustainably-harvested wood for your signs and displays. *See "Exhibition Materials," page 48.* For support posts and frames, look for wood that is naturally resistant to decay and/or is pressure-treated.
- Decide how you will mount the sign or display on the support posts. Mark the location for screws or drill the holes in advance so that when you are ready to attach the sign to the posts you will not have to drill a hole through lettering or illustrations.
- For display panels, sheet plywood with a minimum thickness of 1 cm is suitable. Larger signs require thicker wood. For very large signs, the sign face can be made by gluing thinner pieces of wood together.
- Cut wood into desired sizes and sand the flat sides and edges until smooth.
- Apply an undercoat of oil-based paint. Allow paint to dry and smooth the surface with fine sandpaper. Apply another coat of oil-based paint. (Signs and displays to be placed in bright sunlight are best with a dark background to reduce glare. In a shaded area, a light background increases visibility.)
- Trace your letter pattern and images onto the panel surface. Fill in the letters and images with oil-based paint.
- When letters and images are dry, apply two coats of waterproof varnish or sealer.
  Note: Select paints for your sign or display panel that will not react with the protective coating (sometimes varnish or sealer will cause the paint underneath to discolor). Ask for advice or test the products on a scrap of wood first. Make sure the paint is completely dry before applying varnish.
- Prepare sign or display support posts by painting them or soaking them for at least 48 hours with a wood preservative such as 100% creosote (from a hardware store), 50% creosote and 50% crankcase oil (from an auto mechanic), or 100% used crankcase oil.
  Note: Used crankcase oil may contain chemicals that are harmful to wildlife. Pentachlorophenol (penta) is also used as a water repellent, but it poses a potential health hazard. If penta is available, use caution: wear protective rubber gloves and safely dispose of any unused solution. Alternatively, penta can be mixed (5%) with used crankcase oil.
- Make sure sign posts are long enough to support the sign at the desired level once you have sunk the posts into the ground. In general, posts should be submerged at least 1 m into the ground. In some cases, one post may be adequate to support a sign, but generally, two posts are better than one.

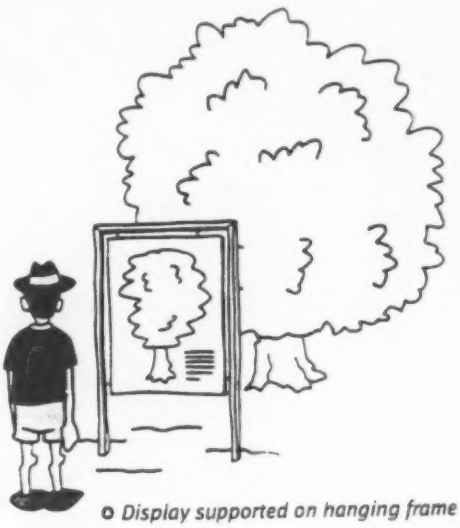
- Dig holes for your posts. The depth of the holes will depend upon the length of the posts and the size and weight of the display or sign that will be supported. In general, at least one-third of the total length of the post should be below ground. Having decided on the depth, make the holes an additional 25 cm deeper and fill this 25 cm with gravel; this allows post holes to drain. For very long posts or a heavy sign, you may need to bed the post bottoms in cement. Posts may also be supported above ground by wooden side struts or braces.
- When posts are in position, apply a wood treatment preservative around each post base.
- Mount the sign panels on the posts with screws. A center post mount (measuring 5 cm x 5 cm) is good for small signs; a hanging frame is suitable for larger signs (use hooks and 10 cm x 10 cm wood for the frame).

(Ham 1992, 283-287; Brace 1977, 161-163.)

Sign with center post mount

Protecting Signs and Exhibits from Vandalism

Signs and exhibits with thick, heavy support posts tend to be resistant to weather and vandals. Posts can be bedded in cement for extra stabilization and to protect them from vandalism. Iron rods, long nails, or spikes driven into the base of posts prevent signs from being pulled out of the ground easily. Long nails hammered randomly into the post, with their heads imbedded, make it difficult for vandals to saw through the support posts.



Display supported on hanging frame

Tree stump used as a sign base

An alternative technique to painting letters or images on a wooden sign or panel is to carve them out with gouging tools. This method is useful for signs with simple titles or images – thick wood should be used, not plywood. If you do not have a router or electric carving tool and plan to cut letters into the wood by hand, you need to select wood that is soft enough for this technique.

- Trace letters or images onto the wood surface. Small letters or highly detailed artwork are difficult to produce by carving. Generally, letters should be no smaller than 2 cm.
- Carve out letters or images to a depth of about 0.3 cm.
- Paint letters or images with a color that contrasts with the background (e.g., white paint on dark wood).
- An easy way to apply the paint is to use a plastic bottle with a screw-top spout to squeeze the paint into the letters.
- When the paint is dry, apply two coats of waterproof varnish or protective sealer.

Letters and images can also be burned into thick wood to create attractive signs or displays.

- Trace letters or images onto the surface of wood.
- Wearing thick cloth gloves to protect your hands, heat a thin metal rod until it glows red.
- Drag the rod carefully along the traced lines. Reheat the rod as needed.
- Repeat until a dark outline is burned into the wood.
- Allow wood to cool and apply two coats of waterproof varnish or protective sealer.

Metal Signs and Displays

Signs and displays can also be created from sheet metal supported on wooden or metal posts or frames. The most suitable metal is aluminum as it is light and does not rust. Metal is usually more expensive than wood and may need to be cut to size, prepared, or worked first by a professional metalsmith. The edges should be finished so that they are not sharp and dangerous. Images and letters can be traced onto a metal display panel and then filled in with oil-based paint; there is usually no need for varnishing afterwards. Metal signs usually last longer than wooden ones and tend to be more weather- and vandal-resistant.

Cement Signs and Displays

Cement signs and displays have the advantage of being permanent, strong and very weather- and vandal-proof. However, they do not have the natural appeal of wood and do not blend well into a natural environment. They tend to be expensive to create and must be made professionally. They are free-standing and do not require a frame. After construction, cement signs need several days for the cement to dry thoroughly before they can be painted with oil-based paints.

Appendix 2E Resources for Interpretive Exhibits

Brace, Judith, Ralph R. White, and Stephen C. Bass. 1982. *Teaching Conservation in Developing Nations*. Washington, DC: Peace Corps Information Collection and Exchange.
Describes nature trails, signs, and printed guides, and has information that can be used to develop demonstration areas on controlling soil erosion, composting, planting and transplanting. Contains examples and instructions for designing interactive and live animal exhibits.

Ham, Sam H. 1992. *Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets*. Golden, Colorado: North American Press.
Chapter 8, "How to Plan and Prepare Inexpensive Exhibits," covers creating a message, interpretive labels, and exhibit panel design. Available in English and Spanish.

Hudson, Wendy E., ed. 1992. *Naturewatch: A Resource for Enhancing Wildlife Viewing Areas*. A Defenders of Wildlife Publication. Helena, Montana: Falcon Press.
Includes examples of trails and wildlife viewing structures with illustrations and a discussion of selection of materials and accessibility.

Knudson, Douglas M., Ted T. Cable, and Larry Beck. 1995. *Interpretation of Cultural and Natural Resources*. State College, Pennsylvania: Venture Publishing, Inc.
Offers ideas for designing effective exhibits, trail signs and brochures, and other types of self-guiding interpretation.

Mandoli, Dina F. *How to Make a Great Poster*. Website: http://www.aspp.org/education/poster.htm
University of Washington, Department of Botany, Box 355325, Seattle, Washington 98195-5325, USA.
Provides good basic guidelines for design and assembly or posters or displays.

Neal, Arminta. 1987. *Help for the Small Museum: Handbook of Exhibit Ideas and Methods*. 2nd ed. Boulder, Colorado: Pruett Publishing Company.
This guide to building, organizing, and displaying exhibits in small museums includes chapters on exhibit planning, tools, materials, wiring, and labeling. Also included are detailed drawings and requirements for handicapped access.

Serrell, Beverly. 1996. *Exhibit Labels: An Interpretive Approach*. Walnut Creek, California: AltaMira Press.
Covers creating an exhibition message, developing appropriate exhibit labels, and evaluating during exhibition development and after exhibition opening.

Taylor, Samuel, ed. 1991. *Try It! Improving Exhibits through Formative Evaluation*. Washington, DC: Association of Science-Technology Centers.
Offers a variety of helpful ideas and methods for applying formative evaluation to exhibition development.

Trapp, Suzanne, Michael Gross, and Ron Zimmerman. 1994. *Signs, Trails, and Wayside Exhibits: Connecting People and Places.* 2nd ed. Interpreter's Handbook Series. Stevens Point, Wisconsin: UW-SP Foundation Press, Inc. Covers the basics for interpretive exhibits, including developing an effective message; components of signs and how to construct them; designing, constructing, and maintaining trails; and trail interpretation options. (For more information: Dr. Michael Gross, College of Natural Resources, University of Wisconsin-Stevens Point, Stevens Point, Wisconsin 54481, USA. Tel: +1 715 346 2076.)

Zehr, Jeffrey, Michael Gross, and Ron Zimmerman. 1991. *Creating Environmental Publications: A Guide for Writing and Designing for Interpreters and Environmental Educators.* Interpreter's Handbook Series. Stevens Point, WI: UW-SP Foundation Press, Inc.
Includes sections on principles of publication design, and designing newsletters and folded publications.

Exhibit Materials

Hatchfield, Pamela, and Jane Carpenter. 1987. *Formaldehyde: How Great is the Danger to Museum Collections?* Cambridge, Massachusetts: Center for Conservation and Technical Studies, Harvard University Art Museums.

Padfield, Tim, David Erhardt, and Walter Hopwood. 1982. Trouble in Store. In *Science and Technology in the Service of Conservation.* Preprints of the Contributions to the Washington Congress, 3-9 September 1982, (pages 24-27.) London: International Institute of Conservation.

Raphael, Toby. 1995. *Conservation Guidelines: Design and Fabrication of Exhibits.* Harpers Ferry, West Virginia: Division of Conservation, National Park Service.

Websites

The following websites include information on wood certification. They list publications, wood certification organizations, and certified forests.

http://www.fscoax.org/
The Forest Stewardship Council, headquartered in Oaxaca, Mexico, is the internationally recognized accreditation agency for forest certification programs.
Tel: +1 802 244 6527

http://www.smartwood.org/
SmartWood, a program of the Rainforest Alliance, is an extensive forest certification program accredited by the Forest Stewardship Council. SmartWood's worldwide network of regionally based conservation organizations implements certification services in tropical, temperate, and boreal regions. Additionally, the SmartWood Rediscovered Program certifies salvaged or recycled wood from buildings being demolished or laid to waste.
Tel: +1 212 677 1900

http://www.certifiedwood.org/
The Certified Forest Products Council is a not-for-profit, voluntary business initiative that promotes the purchase of certified forest products within the North American business community and sponsors a number of outreach programs.
Tel: +1 503 590 6600

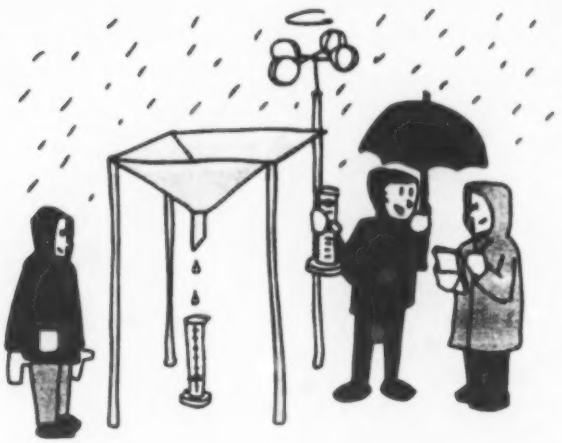
Interpretive Presentations

UNIT 3

Interpretive Presentations

Many interpretive centers offer presentations – interpretive activities guided by an educator. There are several types of presentations you can use to guide visitors through your interpretive center, including: a talk; a tour through the center exhibition area or exploration of the local environment; an activity such as a game or project in which participants write, draw, or construct something relating to a particular concept; or a series of activities in which a group of students or other visitors participate over a period of time.

Your audience for ***presentations*** may include school groups, clubs, or other community organizations that may prearrange visits. Interpretive centers also receive visitors, such as local, national, and international tourists, who come without prior arrangement. Your center may offer regularly scheduled presentations on a variety of topics for these visitors.



As you guide visitors through activities, your role is to facilitate learning through experience. Maintaining an informal and interactive relationship with visitors and providing them with experiences to promote appreciation of the environment and encourage conservation of biodiversity are key components of a learning experience.

Create an atmosphere that is informal and friendly

- As the presenter, you are also the host. Whenever possible, greet visitors; make them feel relaxed and welcome. Ask why they are visiting, what interests they have, what they hope to get out of the experience.
- Always organize and prepare for a presentation, but remember that the audience should be involved in the presentation.

Know your facts, but try to convey them through discussion rather than by lecturing.

- Though establishing rules can be important, keep them to a minimum and weave them into the presentation. Lead by example.

Make your presentation interactive

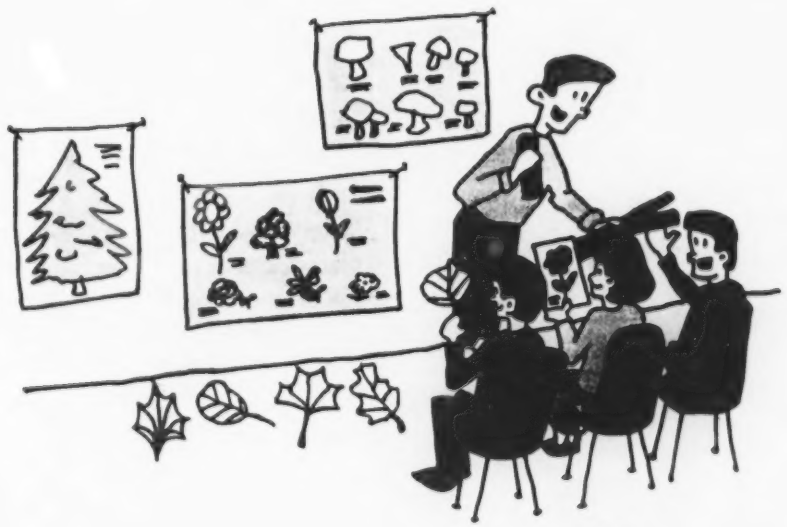
- Lead the audience to discover the points you want to reveal by interspersing facts with questions.
- Use props, artifacts, slides, or other visual aids to provide opportunities for the audience to use their senses as much as possible: seeing, hearing, touching, smelling, or even tasting – only edible things, of course! *See "Using Visual Aids in Your Presentations," page 90 , and Appendix 1C: "Visual Media for Interpretation."*
- Design an activity, experiment, or game for full audience participation. Encourage discussion and, if possible, include activities such as writing, drawing, singing, or other types of performances.

Enable the audience to gain an appreciation of the environment and biodiversity

- Provide experiences for the audience to observe and better understand biodiversity and ecosystem processes.
- Explore how humans mimic nature in their creations (e.g., building design, flight).

Encourage the audience to make a behavior change

- Make a specific suggestion of an action that the audience can take, such as sharing what they have learned with others, continuing to explore the natural world (provide them with a list of books, other places to visit, or groups to join), or thinking about solutions to a community environmental problem.
- Ask your audience what they would like to explore further and how they would like to



do it. Design follow-up activities or exhibits based on their suggestions.

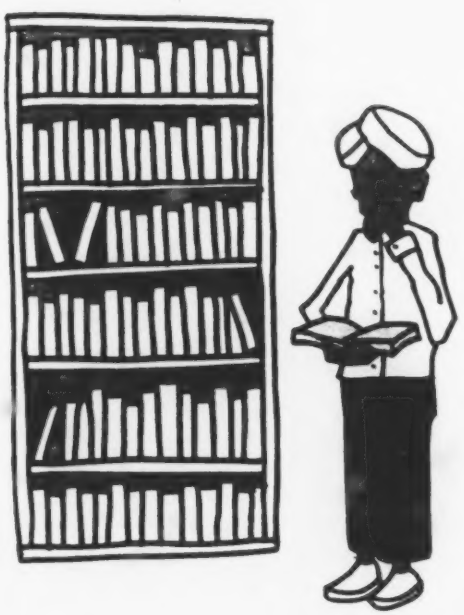
- Create a way within your center to recognize and support responsible environmental behavior (e.g., publicize positive community actions, establish an environmental leadership award).

Preparing an Interpretive Presentation

Content

While interpretation is centered around learners and their experience, it must also provide accurate information. Researching the information for interpretive activities is essential. Some possible sources for information include local conservation organizations, experts working in the area, long-time residents, and governmental ministries or agencies responsible for environmental policy and programs. School books, libraries, and Internet resources can provide valuable information, but make sure you check whether it is current and accurate.

It is important not only to state facts, such as scientific names of plants or animals or the number of native plants or animals in an area, but an educator should explain, or interpret, this information as well. For example, you can inform visitors that the region in which your interpretive center is located is home to 12 kinds of birds, two kinds of carnivores, and 30 flowering plants that are found nowhere else. However, this information is not likely to take on significance for visitors until you explain how these unique plants and animals are part of an intricate web that comprises the forest ecosystem. This ecosystem helps to regulate climate and is a source of resources that support human life, such as clean air, clean water, food, and fuel. As a beautiful, natural place, the forest is also attractive to tourists.



Organization

Any type of interpretive activity, whether an exhibit or a presentation, should include three parts: an introduction, the body of the presentation, and a conclusion. For a presentation, the general rule is to tell the audience what you are going to say, say it, and then summarize what you just said. This may sound repetitive, but it is very useful for organizing a pres-

entation and for helping the audience to absorb information they are hearing for the first time. Some hints for organizing a presentation:

The **introduction** attracts the attention of your audience and provides them with an overview of your presentation.

- Start the presentation with a question or a dramatic real life example that relates to the main message you will present. This involves your audience in a mystery or puzzle that they will want to solve with you.
- Write your introduction last. This enables you to develop a strong and compelling introduction based on the body of the presentation.
- After you have finished writing the entire presentation, create a title that is a catchy restatement of the message.

The **body of a presentation** should describe the main ideas within your message in a way that is relevant, meaningful, and entertaining to your audience.

- Write the body first.
- Present no more than three to five main ideas illustrated by examples, comparisons, analogies, and/or anecdotes.

The **conclusion** summarizes key points and restates the message, connecting it with the lives of the audience.

- Do not introduce new information in the conclusion.
- Leave the audience with something to ponder.
- Suggest specific actions your audience can take.
- Provide them with resources for more information.
- End on a positive note.

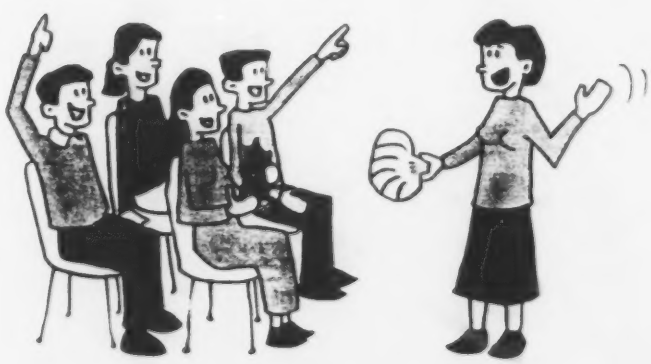
Practice!

Before you give a presentation, run through it yourself in front of a mirror, or try it with other staff, friends, or family who will provide honest feedback on your performance. Make sure that the presentation is well-organized and fits within the intended time frame. Be dynamic in the way you speak and move around.

Presentation Style

If you have the opportunity, observe other interpreters to get presentation ideas, but adapt techniques to fit a style that is natural to you. As you interact with audiences and learn about how people learn, you will develop your own presentation style for keeping everyone involved and focused.

- **"Read" your audience**
  Observe the response of audience members during your presentation. If they appear confused or lose interest, adapt the level of information and the pace, use examples that are familiar to them, or move on to a new activity.
- **Be personable**
  Face the audience. Make eye contact when you are talking to people, unless it is culturally inappropriate. Speak to everyone by turning to address people to your right and left, not only those directly in front of you. Your body language and facial expressions can help to interest the audience in what you are saying. Use humor, when appropriate.
- **Be enthusiastic**
  If you are enthusiastic about your topic, your audience is more likely to be curious about it and to enjoy the experience.
- **Vary your style during a presentation**
  Though you cannot reach all of your audience all of the time, you will be able to reach most of them some of the time if you vary your presentation style. Enliven the presentation with visual aids (e.g., artifacts, illustrations, slides), stories, analogies, discussion, and hands-on activities. (Some of these are described later in this unit.)
- **Keep your presentation moving**
  Know your material, but avoid memorizing it. Prompt cards or cues from visual aids can help you remember the main points of your presentation, making transitions smooth from one point to the next.
- **Be willing to say, "I don't know"**
  Be honest when you do not know the answer to a question. Do not guess or give inaccurate information. Tell your audience that you will find out the answer or suggest that they work with you to do so.



Using Questions to Engage Your Audience

Questions can serve to attract the attention of listeners, find out what they know, and provoke discussion.

Rhetorical questions do not require a response, but serve to attract attention and involve listeners.

> ***If we continue to clear the forest, what will we do when there is no forest left to provide fuelwood?***
>
> ***What will happen to the plants and animals that depend on the coral reef for food and shelter when the reefs are gone?***

Open-ended questions require the respondent to explain something or express an opinion. These questions can help to generate discussion among participants, especially with small audiences.

> ***Why is it important to have different kinds of trees in the forest?***
>
> ***How can farmers prevent siltation in their rice fields?***

Closed-ended questions require a brief, exact reply, often either "yes" or "no." The audience response can help you to understand their level of knowledge about a particular subject or to learn about their behavior. Avoid intimidating audience members; if you are looking for specific answers, make sure that at least some members of the audience can respond.

> ***Have you ever used a chemical fertilizer on your crops?***
>
> ***How long does it take for a tropical forest to regenerate after it has been cleared?***

Presenters may also **redirect** questions from the audience. When asked a question, the presenter can involve other members of the audience by asking them to answer it.

> ***Mario asked how he can prevent siltation in the river where he fishes. That is a good question. Does anyone have any suggestions?***

When you ask a question that requires an answer, allow time for the audience to think before responding. After someone responds, pause again to allow the respondent or others in the audience to add their comments if they wish. In longer activities or a series of activities, you may encourage participants to pose their own questions and figure out ways to find answers.

(Crone and St. John Hunter 1980, 56-57.)

Using Visual Aids in Your Presentations

Visual aids can enhance and reinforce the message of your presentation. They help to illustrate concepts and to connect these ideas with real things. There are a variety of inexpensive but effective visual aids, including:

Familiar objects are things that people use in their daily lives, carry in their pockets, or have in their homes. Thus, they are easily found and can be used at no expense.

Pictures, such as slides, photos, drawings, or posters can represent actual or ideal situations. Pictures of familiar things can be used to evoke analysis, while pictures of things that participants have never seen can be used to broaden their awareness of the world around them.

Models are graphic illustrations of particular concepts. They enable you to show an abstract idea or sequence of events without having to use a lot of words.

Charts, graphs, and diagrams can be used to present new information, summarize key points, display numerical or statistical data, show relationships, or list steps in a process. They can also plot events over time, as in a timeline.

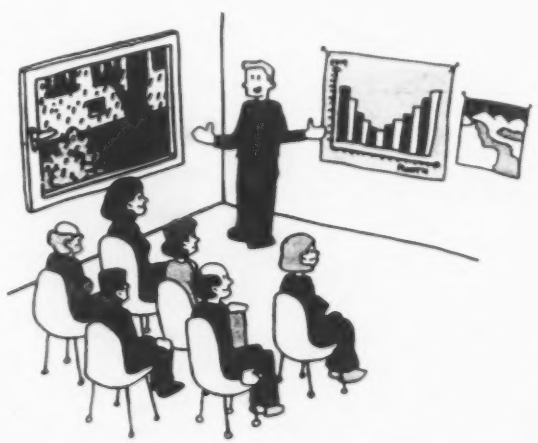
Maps are useful tools for illustration and discussion. They show spatial distribution and location of natural resources, objects, communities and habitats, and are ideal for analyzing environmental relationships and the potential benefits and problems related to differing resource use.

A **chalkboard** or a **whiteboard** with non-permanent markers enables the educator to write key words and draw and change a graphic using different colors during the course of the presentation.

A **story board** allows the educator or audience members to manipulate cloth or paper characters or objects to tell a story or discuss an issue.

Consider audience familiarity with these techniques, particularly with reading charts and graphs.

Visual aids should illustrate, but not replace the main message as the focus of a presentation. Ask yourself, "Do visual aids improve my presentation?" There are some presentations that cannot incorporate visual aids because they present complex ideas that are difficult to illustrate. Also, a presentation should always be able to stand on its own. An interpreter should be prepared to make a presentation



without the use of visual aids. This is important insurance against the possibility that visual aids are not available at a presentation site or that objects are lost or damaged.

Practice using visual aids so that you are comfortable with them. Maintain eye contact with your audience while showing a prop. Talk to the audience, not to the prop! Make sure that everyone can see the object or illustration. Are printed words large enough to be seen clearly by all participants? Pass small objects around. It is also desirable to pass around objects that are interesting to touch, such as a pelt, leaf, piece of bark, or a rock. Use your best judgment in deciding whether the audience should handle an object that is fragile or valuable.
(Ham 1992, 97-98.)

See Appendices 1C: "Visual Media for Interpretation," 4B: "Creating a Slide Show," and 4C: "Creating a Puppet Show" for more information on the variety of visual media, including drama and audiovisual presentations, and how to make your own illustrations and pilot-test them.

Interpretive Tours

While exhibits provide valuable information and experiences for visitors to interact with real or representational objects, and presentations can engage visitors in thought-provoking discussions and activities, many visitors are attracted to interpretive centers because they

want to see wildlife in its native habitat. Your center can offer visitors opportunities to view wildlife and learn about biodiversity.

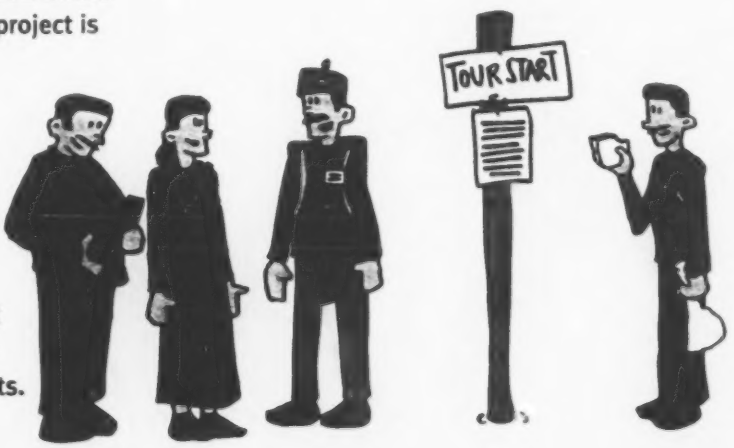
Think about interesting and enjoyable ways visitors can view wildlife around your center while minimizing disturbance to the environment and the creatures that live there. It is important to provide guidelines for visitor behavior around wildlife. To control use of the area, a trail or system of trails for visitors can be constructed. *See Unit 2: "Interpretive Exhibits," page 67.* You can also offer guided tours through your exhibition or along a nature trail. The term "tour" is used here to include any presentation in which the environmental educator leads a group of people through a sequence of stops. *See Appendix 3B: "Training Tour Guides."*

A tour is a mobile presentation. Three characteristics of an interpretive tour are:

- Participants move from place to place.
- Interpretive tours are visual. Stops are selected to show something at that location.
- Tours generally require more of a commitment from the audience than would a talk because of the time and energy involved in moving from place to place.

The following are a few examples of the many different types of guided interpretive tours:

- Follow a nature trail to observe what plants and animals are there and how they interact.
- Lead a visit through a nursery, garden, or other demonstration area.
- Walk through and describe an area where reforestation or a conservation project is taking place.
- Lead participants through the exhibits in your center to highlight displays relating to a particular message. This is an opportunity to provide more in-depth information than is possible through exhibit images and text, and to discuss this information with participants.



An effective interpretive tour is carefully planned from start to finish. Some of the same considerations that are important for planning nature trails, signs, and brochures are important for leading tours. For example, for an outdoor tour, walk the route several times, observing conditions carefully, making note of changes following a storm or other event. Work on your pace, keeping in mind that it generally takes longer for a group to move from place to place than it does for you to walk through the tour by yourself. In addition, there are some critical components in the structure of the tour itself.

Before the Tour

Go to the meeting place for the tour early to help participants find the location. Talk with people as they arrive. Informal conversations help to establish a rapport and also can enable you to address the needs or concerns of individuals going on the tour. Find out about their interests, knowledge level, and expectations.

Introducing the Tour

As with any interpretive activity providing information, either written or spoken, the introduction should capture the interest of the audience. In addition, for a tour it is important to talk about logistics, including the distance and type of terrain that will be covered and any necessary cautions regarding potential hazards or weather conditions. It is also a good idea to post tour times, highlights, and physical difficulty at a central place in your interpretive center or where tours begin.

At Each Stop

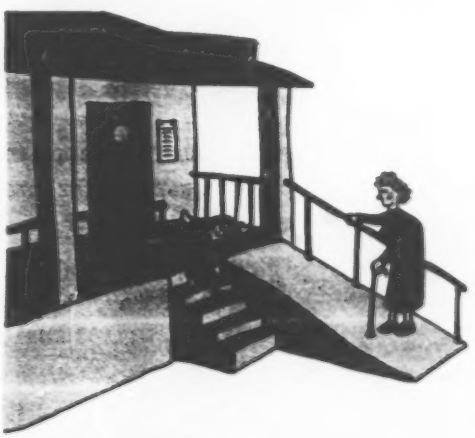
Follow a procedure at each stop that helps the audience to focus on your message, to learn about what they see along the way, and to sustain their interest.

1. Focus the attention of the audience. Indicate the object you want to discuss by standing next to it, pointing, or describing its location.
2. Give a description of the object; identify it and provide an interesting fact or anecdote.
3. Connect this discussion with the central message of the tour.
4. Prepare the audience to continue to the next stop with a transition. This brings discussion to a close, signals that it is time to move on, and foreshadows what is coming next.

Some Additional Things to Consider

- Carry a backpack with visual aids such as rocks, feathers, products made from things found along the nature trail, or tools for field observation (e.g., a field guide, compass, binoculars, or magnifying glass).
- Incorporate short activities at the stops, such as guessing games, sensory exploration (What do you hear? What do you smell?), or a "visual scavenger hunt" that continues throughout the tour as visitors look for particular colors or for evidence of animal life (observing, but not collecting anything).

- If visitors have physical disabilities such as vision or hearing impairments or limited mobility, modify activities: shorten tours or use descriptions, illustrations, and sounds so that visitors have a learning experience that is appropriate for their capacity to hear, see, and get around.



Tips on Tour Mechanics

- Stay in the lead. This enables you to control the direction and the pace.
- Establish a pace that is comfortable for the slowest person.
- Keep within the projected time frame.
- Large groups (more than 20) take longer to move from place to place. You may want to make fewer stops in order to keep within the time frame for the tour. A "co-leader" can assist by walking in the back of the group.
- Make sure that everyone can hear you. Wait until the whole group has reached the stop before beginning to present information.
- Repeat questions from participants to make sure you understand them correctly and that everyone was able to hear what was asked.
- Be open to questions and informal conversation as you walk between stops. This will enable you to better address the interests of participants, and may even give you ideas for additional things to include in future tours.
- Make use of the unexpected. Refer to passing wildlife, damage caused by people, or other changes that you observe in the environment.
- Bring a first aid kit and have a plan in case of emergencies such as injuries or accidents. Remember that you are responsible for the welfare of an injured individual and for the whole group.
- End the tour back at the starting point or make sure that visitors can find their way back easily. You can invite them to walk with you.

(Ham 1992, 131-151.)

Other Types of Guided Activities

Storytelling

Stories can educate and entertain. Some stories teach a lesson or pose a question that must be answered by the listener. Different peoples or cultures have their own histories and traditions that influence the stories they tell. Such "folk tales" often have themes relating to natural and cultural history.

Storytellers can recount strange and remarkable events while relating them to ordinary life or explaining why things are the way they are. In this way, an interpreter can capture the attention of the audience with an imaginative tale that conveys an important message that the listeners will remember. For some audiences, it may also be appropriate to discuss the story and what it reveals about the way people interact with their environment and the beliefs on which their behavior may be based.

Participants can be storytellers themselves. After telling a story and talking about it, you can encourage participants to write their own story or essay on an environmental topic and then tell it to others in the group. Such creative activities can be fun, while providing reinforcement of writing and language skills.

Guided Imagery

Guided imagery takes listeners on an imaginary journey to a place and time where they cannot physically go. The educator's words and the participants' imaginations become the visual aids. Guided imagery can help people to focus on feelings and sounds, understand a concept, or review or reinforce something they have learned previously.

To lead a guided imagery presentation:

- Research your subject in order to create accurate images.
- Develop a script that tells a story by relating images sequentially. Begin a guided imagery trip by inviting participants to sit in a comfortable place. You might select a natural setting or use an audiotape to enhance the effect.
- Help participants to relax and set aside distracting thoughts.
- Guide listeners through the experience using long pauses to allow them to visualize the scene you are describing.
- When you are finished, bring participants back from their imaginary journey and invite the group to share their experiences through discussion or by drawing a picture of the part of the journey that they liked the most.

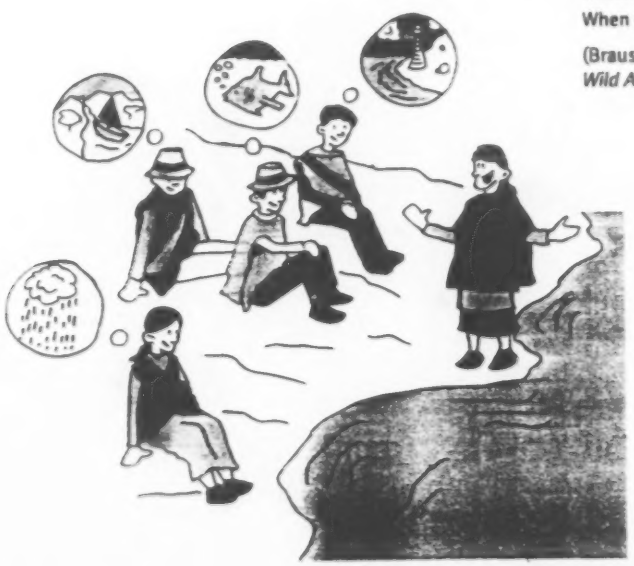
(Regnier, Gross, and Zimmerman 1994, 54-55.)

The Water Cycle

One example of guided imagery illustrates the water cycle through description of how the world's waters are related and how water is important to plants and animals.

"Close your eyes...And listen carefully. You are sitting on the edge of a stream...Your feet are swinging in the clear water...You feel a current washing over your feet, pulling at them...Think about the water flowing past your feet until it reaches a larger stream...The water connects you with the larger stream...See the green trees and other plant life on the banks...The larger stream carries the water past farms, cities, factories, and forests until it eventually reaches the sea...Through your feet and the continuous currents of water you can imagine that you feel the sea...Now stretch your mind and think about how you interconnect with the world's oceans...You are now touching one single body of water that stretches around the world...Your own body contains water that is part of this system...(Continue by describing places where water flows, e.g., it laps against the shores of the Pacific Ocean; it pours from the sky in storms, it drifts by in big white clouds; your feet feel the flow of the current of the ancient Nile River pushing north through Africa)...The water flowing across your feet connects you with everyone else who is now sitting with feet dangling in a stream, wondering where the water goes...It is time to come back...Bring the limits of your senses back from the world's rivers and oceans ...back to your stream and the surfaces of your feet... When you are ready, you may open your eyes."

(Braus and Wood 1993, 216-218 and Project Wild, *Project Wild Aquatic Education Activity Guide* 1992, 4-7.)



Character Sketches

In a character sketch, an interpreter tells or reenacts a story as if he or she is a character in it. For example, the interpreter may take on the role of a farmer, a forester, or another character with whom the audience can identify. For historical characterizations, it is important to be accurate; to the extent possible, make use of authentic costumes and expressions. A costume can serve as a prop to create interest and lend authenticity to your information. Character sketches require some experience in drama.

The Night Spirit

The audience arrived at the outdoor amphitheater along a path lit by candles. The environmental interpreter began a discussion of nocturnal animals (animals that are active at night). Suddenly, a second figure appeared behind the group and walked up to the front. Wearing a cape made of leaves and carrying a glowing torch, she introduced herself as the Night Spirit of the Forest.

The Spirit asked sharply, "Why are you making so much noise?" She told the people gathered about the things they might see if they listened carefully. She asked a volunteer from the audience to help her demonstrate the way bats navigate using sound and how owls spot their prey in clearings.

The Spirit only stayed with the group for ten minutes before she vanished back into the forest, leaving the first interpreter to lead the group on a night walk.

(Adapted from Regnier, Gross, and Zimmerman 1994, 50.)

Instead of portraying a person, an interpreter may represent a non-human creature or thing. For example, you can play the part of a sea turtle looking for a nesting site on a beach where there are brightly-lit hotels or you can personify a tree interacting with plants and animals that depend on it for their survival.

Games

Interpretive activities may be based on games that are familiar to your audience. These encourage everyone's full participation in an activity that is fun, while promoting environmental learning focused on particular concepts and skills. *Three activities especially for children – though they may be adapted for audiences of all ages – are described in Appendix 3A: "Activities for Children."*

Working with Schools

Environmental interpretive centers can be valuable resources for schools. Many environmental education activities include language, math, and science components, as well as problem-solving skills. While school visits to your center should be fun, they can also offer an opportunity to explore the natural environment and integrate this learning with the school curriculum. Consult with teachers about their needs for teaching certain topics or building students' skills. Find out about school district requirements and, if possible, get a copy of the national education standards from the Ministry or Department of Education in order to identify biodiversity-related topics that you can reinforce through your center's program.

Making a connection between education standards and interpretive activities can help to demonstrate to teachers and school administrators that your center offers educational as well as recreational experiences. The more teachers see that what your center offers complements the school curriculum and can assist them in meeting educational standards, the more interested they will be in working with you. Many teachers need training on how to use an interpretive center as an educational resource and how to bring biodiversity topics into the classroom. Teachers need practice to build their confidence in doing activities themselves before they will be comfortable doing them with students. However, teacher training requires resources that can be difficult for a small interpretive center to offer. One way to begin is to ask teachers if they would be willing to have you visit their classrooms to do some activities. This can help you to refine your interpretive presentations while serving as a model for the classroom teacher. You can also look for opportunities to participate in existing teacher in-service trainings offered by the Ministry or Department of Education or the local school district, and pre-service training at teachers' colleges.

Pre- and post-visit activities are important for reinforcing the message presented during a visit to your interpretive center. Visits tend to be more effective when students know something about the purpose of the visit and the subjects that will be covered while they are there. With the input of teachers, you might develop activity sheets or information packets for students to use at school before their visit. At the center, activity sheets can also help to highlight particular concepts as students explore them through exhibits and activities. (However, activity sheets should keep students focused, not replace the focus on observation while at the center.) Follow-up discussion and activities help students to remember their visit and reinforce what they learned. Follow-up can also help you and the teacher to understand what students learned. Teachers can ask students to draw a picture of something they saw, write about it in a journal, write a letter to the center about what they enjoyed most about their visit, or write or act out a story based on something they learned during their trip.

Logistics

Providing Visitor Information

An important function of interpretive centers is to provide preliminary information for visitors to the center or the surrounding area. You might have a reception area located at the entrance to your center or an information station outside or near the beginning of a trail. Because this may be the first thing about your center that visitors see, it should reflect the professional nature of the center. Staff who greet visitors should be dressed professionally, show respect for visitors, and be prepared to answer all kinds of questions. Important information to have available at your information station or reception area includes: hours of operation; entrance fees; a map of the area; a schedule of presentations, including a description, length, and difficulty if it is a tour; where to find bathroom facilities, food and lodging, the bank, or the post office; transportation schedules; seasonal weather conditions; and regulations or warnings.

Another way to provide visitor information is through "roving interpretation." A roving interpreter walks around and talks with visitors informally. While an interpreter may have certain important messages to convey, the interaction usually depends on what visitors want to know or what visitors are doing when the interpreter encounters them.

Scheduling

What can you do if a bus full of school children or tourists arrives at your center unannounced? It is helpful to have some standard presentations or activities that you can lead at a moment's notice. If you have other obligations (such as another tour to lead!) and are unable to lead the arriving group, their leader may be able to conduct his or her own tour, if provided with a written guide or student activity sheets. However, the best thing to do is to avoid such unplanned visits as much as possible. Encourage teachers or other group leaders to prearrange visits by distributing information

about what your center can offer (both at the center and in the classroom) and explaining how to schedule a visit. When scheduling a visit, talk with the group's representative about the subject and type of presentation (within your repertoire) that would best meet their needs. The more informed you are about the group's age, knowledge, skills, and interests beforehand, the better prepared you will be for leading effective activities. Let group representatives know about restrictions on group size (suggest a limit of 20-25 participants per group) and, for school groups, recommend a student-to-adult ratio of one adult per ten students in order to manage the students and provide them with a safe, focused experience at your interpretive center. Schedule visits to coincide with specific events, such as festivals or animal migrations.

Besides giving presentations for prearranged group visits, you may offer regularly-scheduled presentations or tours for tourists who arrive at your center on their own. These may be of particular relevance to the area in which your center is located, covering topics relating to wildlife, geology, or natural and human history. Contact local conservation organizations, museums, or universities to see if any of their scientists would like to give a public presentation at your center. Advertise your programs by distributing a calendar, putting up posters in public places, or making an announcement in the newspaper or on the radio. Post the schedule for the day or week prominently on a board at the center.

Languages

Interpretive centers often receive visitors from other regions or countries who speak different languages. If you would like to offer programs in visitors' native languages, make sure that staff is not only capable of reciting phrases, but is also able to answer questions. If you or your staff do not have the capacity to do this, seek ways to improve your language skills or consider finding a translator so you can at least offer written materials in commonly-spoken languages. Using symbols or picture-based interpretation allows people who cannot read or speak a different language to benefit from their visit.

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Other alternatives include "audio commentary systems" where visitors can press a button on a display to hear or read their own language. Headsets or portable cassette players with recorded commentaries can be made available for loan. Videos or films can offer narration in several languages.

Visitor Problems

Sometimes visitors engage in behavior that is potentially dangerous to them or damaging to the environment. It is important to post and state rules clearly; however, this does not preclude the necessity of enforcing rules for visitors who ignore them. Sometimes, simply reminding people of rules is enough. In other cases, you may have to ask people who violate rules to leave. If neither of these approaches solves the problem, you may need to ask for assistance from local authorities or others who are respected in the community.

You may encounter visitors who are angry for any number of reasons – an accident, a missed opportunity, bad weather, exhaustion from traveling. When an irate visitor voices a complaint, try to understand the visitor's feelings; imagine how you would feel in his or her situation. Generally, if you listen and express concern, this helps to diffuse the visitor's anger or frustration and you can discuss possible solutions. Provide a suggestion box so that visitors can give you input regularly.

If a visitor becomes argumentative during a presentation, try to minimize disruption to the presentation. It may be possible to ignore a comment, but often it is necessary to acknowledge the statement and refocus discussion to avoid losing control of the situation.

Appendix 3A Activities for Children

Activities at an interpretive center should allow children to focus on particular components that convey an exhibit's ***message***, rather than trying to cover everything. With young children, it is especially important to keep activities short and have them move on to new places and ideas often. However, for any group of children, it is essential to challenge them and keep things active; it easier to maintain order if you maintain interest. *See also Appendix 1B: "How Adults and Children Learn."*

Activities to Explore Exhibits and their Messages

- Attach pictures (laminated for durability, if possible) to exhibits with velcro or magnets. These pictures may be taken down, mixed up, and handed out to children. Ask the children to replace the pictures where they belong on the display. For example, with an exhibit illustrating the different parts of a tree, use pictures or text representing tree parts (leaf, trunk, root) that children match with appropriate places on the tree. Older children can take pictures or text representing tree products (furniture, oxygen, fruit) and place them on the part of the tree that is the source for the product.
- Plan classification activities geared to the children's learning level. The following are suggestions for different age groups:
  Early childhood: Group animals portrayed in the exhibition according to color, size, or shape.
  Middle childhood: Classify animals according to their group (birds, mammals, fish, insects).
  Adolescence: List the parts of plants and animals that help them to adapt and survive in their habitat.
- Pass around objects related to the exhibit for children to touch and describe.
- Ask children to draw their favorite part of the exhibit or suggest modifications to exhibits.

See Unit 2: "Interpretive Exhibits," "Enhancing Your Exhibition," page 62 for further information.

Example Activities

Some environmental education activities that you can adapt to your location are described here. Each activity states an objective in terms of the concepts, skills, and attitudes that are addressed; materials needed; and the procedure for the activity. Extensions provide ideas for further exploration of the concepts covered, assessing what participants learned, and adaptations for different age groups or situations. This structure can be used to design your own activities.

Memory Match

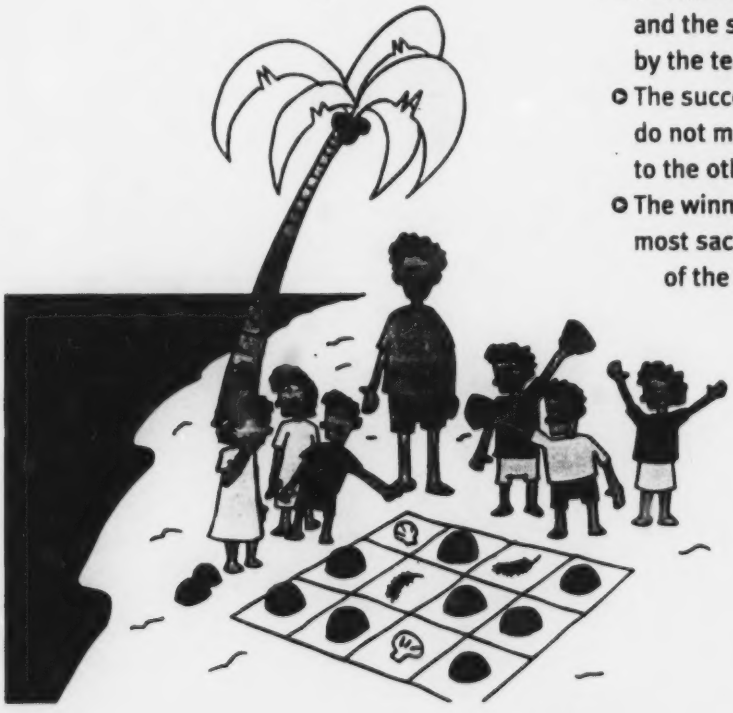
Objective

Participants will improve their memory and observation skills while becoming more familiar with local, natural objects.

Estimated time: 30 minutes
Target age group: Five years and up

Materials

- Six pairs of objects, such as feathers, shells, or rocks. At least a few of these objects should be familiar to the participants. Photographs may also be used.
- Twelve sacks, coconut shell halves, bowls, or other covering.
- A 12-square grid (made with string or drawn on the ground with a stick or chalk).



Activity

1. Place one object in each square on the grid.
2. Cover each object with a coconut shell or bowl, or place it in a sack.
3. Divide the participants into two to four teams.
4. Explain the procedure for the game:
   - The primary goal is to find the pairs. Begin by having one team uncover two objects. If the objects do not match, they are covered again and the next team uncovers two objects.
   - When two items are uncovered that do match, the team members should touch and describe them. The facilitator can ask questions about the object to encourage close observation.
     Examples: What is it? What color is it? Where is it found? What is it used for?
   - The matched objects are left on the grid and the sacks or coconut shells are held by the team as points.
   - The successful team continues until they do not make a match, when the turn goes to the other team.
   - The winning team is the one with the most sacks or coconut shells at the end of the game.

   Note: It is not necessary to keep score if participants become more interested in winning than in learning.

Extensions

1. At the end of the game, question the participants in

detail about the objects. Remember to keep your line of questioning within their learning capabilities.

Early childhood: Have participants make comparisons by asking them to pick out objects of a certain color, shape, or feature (i.e. sharp, smooth, hairy). They can compare plants and animals by picking out the objects that come from each.

Middle childhood: Have participants make comparisons and determine relationships. Can they find two objects that are part of a food chain? Can they find an object people rely on for food?

Late childhood: Ask questions about relationships and adaptations. In what kind of environment does this animal or plant live? What features does it have that enables it to live there?

2. Play the game using varieties of one type of object, such as seed pods, feathers, or rocks. Discuss methods of seed dispersal, different types of birds and where they live, or classification of rocks and how they are formed.
3. Have the participants draw the natural objects. Then ask them to draw related objects on the same page. For example, if the object is a feather, participants may also draw the tree where the bird lives and insects or worms that the bird eats. Discuss the relationships after they have completed the drawings.
4. Follow up with a discussion about appropriate collection of objects from nature.

(Based on an activity from the Discovery Room, American Museum of Natural History)

Build a Tree

Objective

Participants will describe the general structure of the tree and explain how different parts of a tree work.

Younger children will be able to name leaves, trunk and branches, and roots. Older children will also be able to name component parts: heartwood, xylem, cambium, phloem, bark, lateral roots, taproot, rootlets, and root hairs.

Estimated time: 30-40 minutes
Target age group: Ages eight to 12 years

Materials

- Felt board and pieces of fabric or chalkboard for preliminary discussion. (Optional; for step one, page 105.)
- Role cards:
  Write the parts of a tree on separate cards. The table opposite lists parts, the number of cards for each part, and the message and gesture for each. Adjust the numbers depending on the size of your group or assign a certain number of students to share one card.

Tree Part	Number of Cards	Message	Suggested Gesture
Heartwood	2	"I am the heart of the tree. I give the tree strength."	Flex muscles.
Xylem	3	"I am the veins of the tree. I bring nutrients from the ground to the leaves."	Crouch down to "collect the food," then reach overhead to "release" it.
Cambium	6	"New xylem, phloem, cambium."	Sway back and forth between the xylem and phloem layers.
Phloem	5	"I am the veins of the tree. I bring nutrients from the leaves to the roots."	Reach overhead to "grab food," then crouch down to "release" it.
Roots	4	"I am the roots. I bring water and nutrients into the tree."	Crouch down and spread fingers to represent root hairs.
Leaves	6	"I am a leaf. I am the lungs of the tree."	Wiggle fingers overhead.
Bark	4	"I am bark. Please keep out."	Lock arms facing outward from the tree.

For younger children, roles can be simplified to include only: leaves, trunk, branches, and roots.

Activity

1. Begin by constructing a tree with fabric parts that attach with velcro or sand paper to a felt board. You may also ask participants what things a tree needs to survive and list these on a chalkboard. Ask children how a tree gets these things, especially since it cannot move around to look for food, water, and light. (Modify this discussion for gathering students around a tree outdoors, if you prefer.)
2. Tell participants that they are going to create a tree by acting out the tree parts they have just discussed. Have each student or group of students take a role card and then lead the group to a large area where they can build a tree.
3. Beginning with heartwood, "build" the tree. Ask questions as you go, such as:
   - What is at the center of the tree and gives it strength? (heartwood).
   - What part of the tree transports water to all parts of the tree? (xylem).
   - Where does the water in the xylem come from? (it is absorbed by the roots).

- Where does the water in the xylem travel? (to the leaves).
- What happens to the food that leaves make using sunlight, air, and water? (it gets transported to the rest of the tree).
- What part of the tree transports food from the leaves to the rest of the tree? (phloem).
- What important tree part has been left out? (Cambium is the layer that produces new xylem and phloem that keeps the tree growing.)
- What final component of the tree is missing? It protects the tree (bark).

As children take their appropriate places in the tree, they should practice their phrase and gesture two times. When the tree is completely built, have everyone chant and gesture at the same time.

Note: If you do not have a large, clear area for this activity, students at the center of the tree can stand on sturdy chairs. Those playing roots can lie down, sit, or crouch, as appropriate.

Extension

After exploring how a tree works, ask children how they benefit from trees. Have each child draw a small tree on a piece of paper (or do this as a group activity on the chalkboard). In pairs or as a group, children take turns explaining parts of a tree and their functions. Draw eight lines coming from the tree like the spokes of a wheel. At the end of each line, ask students to write or draw something that the tree gives them (furniture, pencils, apples, shade, etc.)

(*Project Learning Tree* 1993, 223-226; Ranger Rick's NatureScope, *Trees are Terrific!* 1952, 10-12.)

Web of Life

Objective

Participants will be able to describe the relationships between living and non-living things in an ecosystem.

Estimated time: 30 minutes
Target age group: Approximately ages seven to 12 years

Materials

- Ball of yarn or twine
- Role cards:
  To make role cards, have students write one word on each card: light, air, water, soil, plants (you can get more specific with names of plants or plant parts, such as seed, flower, leaf, branch, trunk, roots, bark), names of primary and secondary consumers. Students may also illustrate the cards.

Activity

Review the following concepts:

- The energy in an ecosystem begins with the sun.
- Producers (green plants) are the first to use this energy because plants are the only living things that directly transform sunlight (heat energy) into carbohydrates and other compounds important to living organisms. The process by which plants convert light into food is called photosynthesis. Solar

radiation from the sun also contributes to the water and temperature flow on the planet.

- Primary consumers are living organisms that eat plants.
- Secondary consumers are living organisms that eat primary consumers.
- Light, air, water, and soil are important for the survival of many living things.

1. Have students sit or stand in a circle.
2. Distribute one role card to each student.
3. Begin by using yarn to connect light, air, water, and soil to plant parts.

4. Connect plant parts to plant eaters, and plant eaters to light, air, water, and soil.
5. Connect meat eaters to the appropriate plant eaters. Meat eaters should also be connected to light, air, water, and soil.
6. Make as many connections as possible until each student is holding strings coming from different directions.

Ask the students to imagine what would happen if the water were polluted and killed some of the plants. Those who are affected drop their strings. What if the trees were cut down in the forest? Who is affected? Discuss how changing one component can affect the whole ecosystem. Ask students how they affect the environment in which they live.

Extension

Have children work individually or with a partner to draw their own "web," using arrows to indicate the interdependence among the components. Children can also construct their own models or mobiles using a wire clothes hanger and string to connect the sun, air, water, soil, plants, and animals. They can hang these up at your interpretive center or bring them home.

Appendix 3B Training Tour Guides

Ecotourism refers to responsible travel that protects the natural environment while sustaining the well-being of local people. Through ecotourism, local residents can become involved in and benefit from conservation of biodiversity. There are a variety of roles that local people can have in ecotourism; some provide greater benefits than others. In many areas, local residents participate by giving tours. They can be excellent tour guides because of their knowledge of the area and the culture. However, they often lack the necessary knowledge and skills to interpret the environment for visitors. Training guides and assisting them in organizing a system for guiding tourists is important to better serve visitors and to make guiding more effective, and potentially more profitable.

Important components of guide training are: information about an area's natural history and biodiversity conservation, skills in environmental interpretation and the ability to speak the languages of visitors, and the establishment of standards for work and providing services for tourists. A guide can provide a local perspective – not just facts – by describing the role of particular plants and animals in the ecosystem as well as how they are used by local people. Guides set an example through their own actions and enforce conservation behaviors on the part of visitors: staying on marked paths, not feeding animals, collecting trash, asking permission of local people before taking their photograph. Guides should also provide information about specific actions tourists can take to help local conservation efforts.

104

Guides need to be able to communicate effectively and appropriately in the language used by the majority of tourists. For this reason, guide training should build language skills with vocabulary relevant to the topics guides will present. For example, in Honduras, an intensive four-month training program has been developed by the RARE Center for Tropical Conservation and World Teach* volunteers to provide guides with English lessons based on the content and topics they need to be able to communicate to tourists.

The training involves role playing; participants take on the roles of guides and tourists to practice their language skills in situations they might encounter as guides. The final month is spent at a tourist site where guides practice what they have learned. Not all guide training is this extensive, but the combination of language training, building interpretive skills, and practice is important.

Defining work standards is essential because, in many cases, guides are not familiar with the tourists' expectations. Some parks and reserves have established an accreditation system for guides. Those who are trained to be "official" guides agree to abide by certain standards which help to ensure the enjoyment and comfort of visitors. Rates for guided tours may be set to ensure a fair opportunity for all guides and to avoid hassles for tourists. Guides should be dependable, punctual, and concerned with visitor safety.

Local guides can choose tour topics based on the overall interpretive plan. Focus on a conservation message, including information about important and unique natural resources in the area.

- What unique plant and animal species are found in the area? Are any of these endangered?
- What are the threats to biodiversity in the region and what conservation efforts are underway? How can visitors help?

Relating the conservation message to the context and culture can make the message more interesting and easier for visitors to understand:

- What are the geographic features of the area?
- When was the area settled and by whom?
- What products are imported or exported?
- What is the structure of the local and the national government?
- What is the social structure? How important is the family and what are the roles of its various members?
- Where do people live? What do they eat? What kind of work do they do? What do they do for entertainment?
- What are the education and health systems like?
- What are the traditional activities and arts (e.g., music, dance, storytelling)?

It is important to tailor the tour to the interests of various groups.

* RARE Center for Tropical Conservation is a non-profit organization based in Philadelphia, Pennsylvania that aims to protect endangered tropical wildlife and ecosystems while enhancing the effectiveness of local conservation organizations. World Teach is a private, non-profit organization based at Harvard University that sends volunteers overseas to teach in developing countries.

Appendix 3C Resources for Interpretive Presentations

Braus, Judy A., and David Wood. 1994. *Environmental Education in the Schools: Creating a Program that Works!* Troy, Ohio: North American Association for Environmental Education.
Guided imagery, storytelling, working with schools; integrating environmental education into the curriculum, working with national curriculum standards.

Cornell, Joseph. 1998. *Sharing Nature with Children.* 2nd ed. Nevada City, California: Dawn Publications.
Forty-two nature awareness activities for children.

Cornell, Joseph. 1989. *Sharing the Joy of Nature: Nature Activities for All Ages.* Nevada City, California: Dawn Publications.
Activities organized according to stages for awakening nature awareness among people of all ages: (1) awaken enthusiasm, (2) focus attention, (3) direct experience, (4) share inspiration.

Crone, Catherine D., and Carman St. John Hunter. 1980. *From the Field: Tested Participatory Activities for Trainers.*
New York: World Education.
How to create and use visual aids.

Ham, Sam H. 1992. *Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets.* Golden, Colorado: North American Press.
Presentation skills; using visual aids.

Regnier, Kathleen, Michael Gross, and Ron Zimmerman. 1994. *The Interpreter's Guidebook: Techniques for Programs and Presentations.* 3rd ed. Interpreter's Handbook Series. Stevens Point, Wisconsin: UW-SP Foundation Press, Inc.
Presentation skills (questions), using props, slide talks, and other types of interpretive presentations (storytelling, guided imagery, puppet shows). Leading interpretive tours on nature trails, information stations, and roving interpretation.

Ryan, Karen-Lee, ed. 1993. *Trails for the Twenty-first Century: Planning, Design, and Management Manual for Multi-use Trails.* Rails-to-Trails Conservancy. Washington, DC: Island Press.
Planning trails with community involvement; trail design including surface, structures; discussion of multiple uses including walking, cycling, horseback riding (U.S. focused, but the technical information, in particular, is useful in guiding trail design in any location).

Vella, Jane K. 1979. *Visual Aids for Nonformal Education.* Center for International Education, University of Massachusetts, Amherst, Massachusetts.
Publications Officer, 285 Hills South, University of Massachusetts, Amherst, Massachusetts 01003, USA.
Describes creating and using visual aids, based on the author's experiences in eastern Africa.

WWF, NAAEE. 1998. *The Biodiversity Collection: A Review of Biodiversity Resources for Educators.* Baltimore, Maryland: World Wildlife Fund Publications.
A compendium of exemplary environmental education resources that focus on biodiversity, designed to help educators find materials to enhance biodiversity teaching in a variety of settings.

Werner, David, and Bill Bower. 1982. *Helping Health Care Workers Learn: A Book of Methods, Aids, and Ideas for Instructors at the Village Level.* Palo Alto, California: The Hesperian Foundation.
The Hesperian Foundation, P.O. Box 1692, Palo Alto, California 94302, USA.
How to make, take, and use pictures.

Activity Guides

National Wildlife Federation. Ranger Rick's NatureScope Series. New York: MacGraw Hill, Inc.
MacGraw Hill, Inc., 11 West 19th St., New York 10011-4285, USA.
Each issue in the series focuses on a particular topic and provides background information, activities, and bibliography. Topics include: rainforests, oceans, deserts, wetlands, trees, endangered species, mammals, birds, reptiles and amphibians, and insects.

PLT. 1993. *Project Learning Tree Pre K-8 Activity Guide.* Washington DC: American Forest Foundation.
1111 19th Street, NW, Washington DC 20036, USA.
Tel: +1 202 463 2462
Website: http://www.plt.org
An excellent resource guide containing interdisciplinary activities, using forests as a window on the natural world.

Project WILD. 1992. *Project WILD K-12 Activity Guide* and *Project WILD Aquatic Education Activity Guide*. Bethesda, Maryland: Council for Environmental Education.
5430 Grosvenor Lane, Bethesda,
MD 20814, USA.
Tel: +1 301 493 5447 Fax: +1 301 493 5627
E-mail: natpwild@igc.apc.org
Website: http://www.projectwild.org/
Activity guides focusing on wildlife and habitat.

Project WET. 1995. *Project WET: Curriculum and Activity Guide*. Bozeman, Montana: The Watercourse and Council for Environmental Education.
201 Culbertson Hall, Montana State University,
Bozeman, MT 59717, USA.
Tel: +1 406 994 5392 Fax: +1 406 994 1919
E-mail: rwwmb@gemini.oscs.montana.edu
Website: http://www.montana.edu/wwwwater/
A collection of water-related, hands-on activities.

WRI. 1994. *Teacher's Guide to World Resources*. Baltimore, Maryland: World Resources Institute Publications.
Activities for secondary school students, including modules on population, biodiversity, and other relevant topics.

Community Outreach

UNIT 4

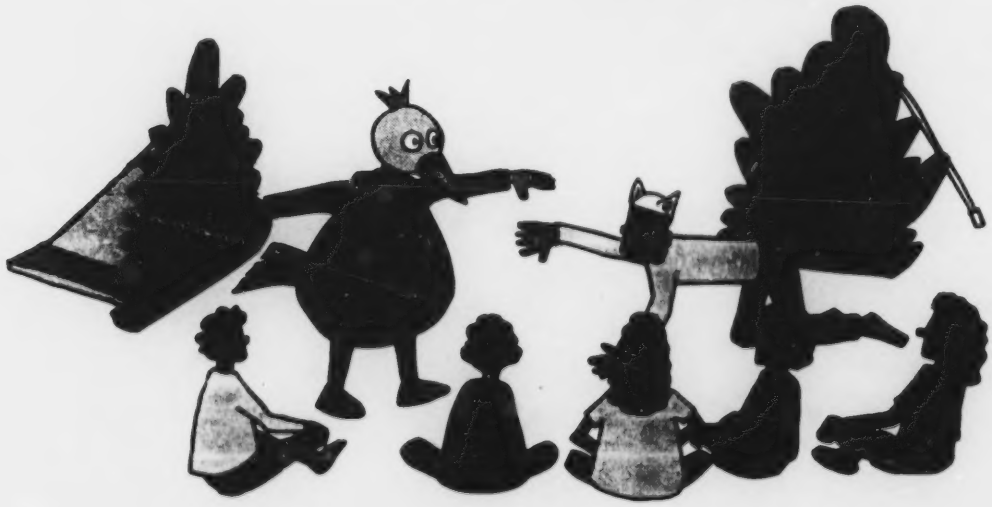
Community Outreach

Community Outreach activities enable environmental facilitators to "reach out" beyond the walls of an interpretive center. If you do not have a center or some sort of established location for environmental education activities, community outreach may be the primary way that you can carry out your programs.

Films, videos, slide shows, puppet shows, traveling exhibits, and dramatic or interactive presentations can be useful for conveying your message in areas with limited access to interpretive centers. *For descriptions of these tools and how to use them in interpretive programs see: Appendix 1C: "Visual Media for Interpretation," Unit 3: "Interpretive Presentations" (page 90), Appendix 4B: "Creating a Slide Show," and Appendix 4C: "Creating a Puppet Show."*

Community outreach provides an opportunity to:

- Facilitate dialogue in the community concerning environmental issues
- Reach a broad audience, including those who cannot come to the interpretive center
- Enhance visits to the center with pre- and post-visit activities
- Publicize your interpretive center and its mission
- Build support in the community for the center and for the environment
- Mobilize people to act on a solution to an environmental problem



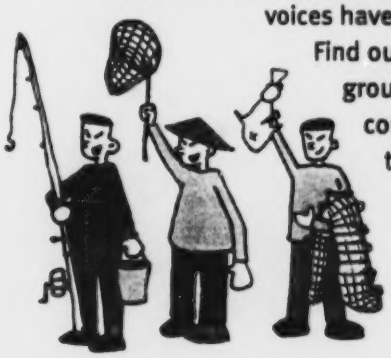
A community outreach program should be systematically planned, implemented, and evaluated. *See Unit 1: "Program Development" for steps in planning an interpretive program and designing interpretive activities.* The tendency in community outreach is to take on activities as opportunities arise. While it is important to take advantage of occasions and available resources, it is essential to avoid an *ad hoc* approach in which activities are not clearly defined in terms of goals and expected outcomes. As with all interpretive programming, it is crucial to first identify the issues, audience, and potential partners, and then consider approaches for outreach that are appropriate and possible within the available resources.

Audiences for Community Outreach

Outreach activities play an important role in increasing environmental awareness among a much broader audience than can be reached at the interpretive center site. The following groups or individuals can be targeted through outreach activities:

- People who have visited, or will visit the center
- People who do not or cannot come to the center (e.g., school groups with time or resource constraints that prevent them from visiting)
- People who do not know about the center and its programs
- People who do not understand or are not currently interested in what the center has to offer

Though community outreach can potentially target a large number of people, it is still important to know who the groups are within this large audience. Try to get beyond the idea of a "general" public by segmenting the audience into groups according to their interests. These interests may be economic, social, cultural, or religious. Examples are rice farmers, craftsmen, vegetable sellers, shop owners, or a church group. Some groups overlooked in the past – women, out-of-school youth, and the disabled – have recently been getting more recognition in conservation and development projects. Keep such groups in mind and make a concerted effort to include those whose voices have not been heard. Find out the needs of any groups you identify and consider programs that address these.



Meeting the Needs of the Community

In 1995, the Education Center staff at the Ivoloina Zoological Park in eastern Madagascar considered developing an after-school program to increase students' awareness of local environmental issues. However, when researching existing programs elsewhere in Madagascar, members discovered that parents felt that extra-curricular activities took students' time away from their homework. In subsequent discussions with community members, this proved to be a particular concern for parents in the rural areas surrounding the Center where students perform poorly on the standard exam required for graduation from primary school. Therefore, the staff designed a program to give students from three nearby schools intensive lessons to prepare them for the exam. The program included short activities on environmental themes, with the possibility of earning a certificate for performing well on an environmental quiz at the end of the year.

The first two years of the program were very successful; 96% of the students qualifying for secondary school in the second year course. The best students in the program won support for their school expenses for one year through a scholarship program at the Center.

Local residents then began to take a greater interest in the Ivoloina Education Center. Parents, who were initially apathetic about their children's participation in Center programs, demonstrated their support by cooperating in the reconstruction of the Center after it was destroyed by a cyclone. The program continues to integrate general education with environmental lessons, including information about Madagascar's biodiversity. This is an example of how educators expanded their agenda to address a need expressed by community members, and thereby more effectively conveyed their message about biodiversity conservation to students and their parents.

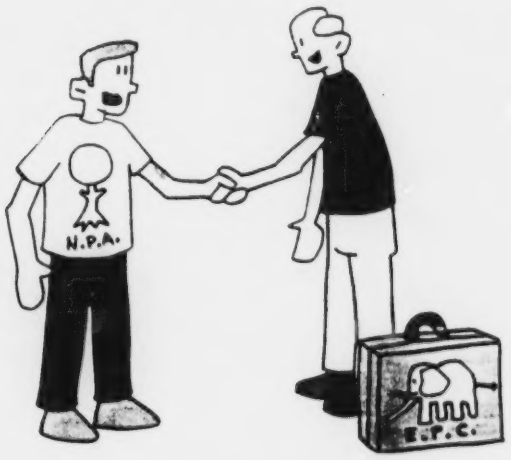
As you identify your audience, it is important to look at the context and consider factors that may facilitate or prevent ***participation***. What social, cultural, or economic influences in the community affect your audience? What forces beyond the community – political, economic, and educational systems – might influence their participation? Has your ***target audience*** had previous negative experiences with a particular individual or organization? Considering these questions will help you to anticipate the audience's reception of outreach activities.

Though language is an issue that you need to deal with for exhibits and presentations at your interpretive center, it can pose an even greater challenge in communicating your message in different villages throughout the region. If you or your staff are not familiar with local dialects, you may need to speak through an interpreter or seek assistance in translating written materials.

As with any of the types of interpretive programs described in this manual, the message presented through community outreach must be relevant to the lives of your audience. Working in the community itself provides an opportunity to make the link very clear between your message and the lives of local residents.

Forming Partnerships

Partnering with existing programs can be an efficient way to convey your message without expending a lot of resources. If there are other environmental education programs, consider ways to work together to reach a broader audience. For example, if staff members from another environmental education program already work in certain villages, they can take the lead there, while including some of the themes and materials that you have developed.



Look for links with the formal education sector. In many countries, national education standards now include environmental subjects. Students are also required to learn skills that can be introduced and reinforced through environmental education activities. Combining your skills in interpreting the environment with the pedagogical expertise of classroom teachers can improve the learning experiences of students while introducing environmental topics. *See also Unit 3: "Interpretive Presentations," page 97, for ideas on working with teachers and schools.*

There may also be opportunities to partner with agencies working on other programs such as health, population, or adult literacy. Discuss with them how your message might be included in their programs. You will need to work alongside these people at first to see how the relationship works and provide training for their staff on issues that concern you. Look for common ground, but be aware that there may be conflicting messages presented by your organizations that will have to be resolved.

Guidelines for Building Partnerships

- Be open-minded; think of other agencies as potential partners, rather than adversaries.
- Establish clear project goals.
- Maintain open communication between partners to avoid misunderstandings and keep partners involved as the project progresses.
- Be realistic about what can be accomplished with available resources.
- Progress at a pace that accommodates everyone.
- Be diplomatic; share responsibility and give credit where it is due.

(Based on Hudson 1992.)

Community Outreach Activities

To best reach diverse audiences and convey complex messages, you may want to use a combination of communication methods. However, these must be developed in a systematic way and linked with goals and objectives.

Key Questions in Determining Appropriate Ways to Communicate

- Do people know about the issue you want to address?
- Is the issue complicated? Is it controversial?*
- Is the issue urgent? Does it need to be relayed within a particular time period or during a particular season?
- How many people do you aim to reach?
- Do you have the resources, including personnel and materials needed for community outreach, or can you apply for assistance?

A number of community outreach activities are described below. This discussion is intended to give you an idea of the variety of possible methods and to serve as a starting point in thinking about what would work best for you in your situation. Regardless of the communication channel you select, you should test it first! Select a group of teachers, community leaders, or other individuals to help develop pilot programs and materials. Pilot groups should reflect the audience you wish to target with the program.

Communication Methods

Interpersonal communication

Interpersonal communication is the exchange of information between individuals. It is most effective for reaching individuals or small audiences, allowing for dialogue and feedback. It can be instrumental for explaining complex issues, and for convincing or influencing your target audience. Interpersonal communication is probably the best way to begin when exploring outreach options for your center. Get to know your audience. Your presence in the community is an important part of increasing your visibility and building a relationship with people in the community informally.

Personal interaction also allows you to assess existing communication channels in the community:

- What are some of the ways that people currently communicate? Talk to village elders, and groups of men, women, and youth. Look at clubs, agricultural extension programs, or other networks, both formal and informal.
- Where do people go for news? Popular locations might include a school, religious building, library, video club, or the post office. People may also gather at a central location such as on the plaza, in the marketplace, under a tree, or at another landmark. When do people go to these places?

* The issues you wish to address, or behavior you feel should be targeted, may spark controversy in the community. Cultural or religious traditions, social status, or economic interests may conflict with your message. In this case, be flexible and patient. You may need to use mediation and conflict resolution techniques to arrive at a compromise. *See Appendix 4A: "Facilitating Discussions" for ways to address conflicts constructively.*

Utilizing common communication channels will make it easier to transmit your message because they are familiar to your audience, and they work!

Individuals who are respected and trusted in the community can serve as role models or spokespersons. Dialogue with influential members of the community can be very effective in catalyzing environmental action. Look for potential **"multipliers"** – people, such as teachers, religious leaders, innovative farmers, policy makers, journalists, and other community leaders – who will multiply, or spread, your message by sharing it with many others.

Convening community members

As an educator, one of the most important things you do is to **convene** people, or bring them together. Residents may be convened through discussions, meetings, and workshops. Discussions and meetings generally bring together a group to talk about or make decisions on local issues. Workshops are designed to deal with a particular issue (possibly identified in a previous meeting or discussion) in greater depth than is possible at a meeting. In workshops, participants engage in learning activities, demonstrations, practice and applications, discussion, and role-plays.

Convening local residents is included here as a type of activity or tool, but it is the basis of many kinds of outreach programs. The key feature of convening community members is that it is a participatory process. When facilitating a discussion, an educator acts as a guide, drawing on the knowledge of participants, enabling collaborations to develop, and fostering consensus-building, or agreements, so that people can collectively identify their agenda for action.

Observe the dynamics among different groups and individuals. Ask the advice of people whose opinions you trust. When facilitating a discus-

sion, try to remain neutral; respect each individual's contribution. For collective decisions and actions, it is vital that all opinions are considered. If certain individuals are dominating, you might suggest continuing discussion of their important points after the meeting.

Gender and status can influence the level of participation of various community members. For example, women are often reluctant to speak at meetings because they are discouraged from doing so by their husbands or other men in the community. If you are working with people who are not accustomed to expressing their views, you will need to take more time to establish trust and make them comfortable in discussion. Though it is important to involve all ***stakeholders*** (people who have an interest, or stake, in the implementation and/or outcome of a project), initial meetings may be most beneficial if they are convened for a particular group in order to clarify their common interests and identify potentially controversial topics. This will help them to prepare for dialogue with other groups or individuals who may have opposing views and have greater influence in the community. *See Appendix 4A: "Facilitating Discussions" for examples of facilitation techniques.*

Mass media

Mass media such as radio, television, or newspapers have the potential to reach a large audience and foster environmental awareness. In developing countries, the media can play a key role in relaying in-depth information where

other educational materials are limited. Research the feasibility of using mass media as a means of educational outreach. Some questions to consider are:

- How complex is the information you wish to present? How often should the information be repeated?
- Does your message have local or national relevance?
- What types of mass media reach your intended audience? Does your intended audience have access to radio and/or television? What time do they listen? Do they have control over what station they listen to? If your audience is literate, what newspapers do they read?
- How can you get your program on the air or in the paper? Are journalists willing to cover your story or run your program? Journalists may need to be educated first, but once you capture their interest, they can be invaluable in helping you get your message out to a large number of people at low or no cost to you. Newspapers may print announcements about community events or local environmental issues free of charge if it is in the public interest.
- What additional or complementary programming should occur to reinforce the message?

One way to begin is to write a press release announcing an event or describing a local environmental problem *(see the box below)*. Another possibility is to partner with a newspaper, radio, or television station to launch an educational campaign. It may be desirable to do both; a press release may be followed by an education campaign that includes a series of stories or activities over a period of time. To attract greater attention to your campaign, try to link it with other events in the community.

Writing a Press Release

- Send out a press release only when you have something interesting to say – announce an event, an award, the opening of a new building, or the formation of a new group.
- The first paragraph of the press release should, in two sentences, grab attention and present the most important facts. This improves your chances of getting your story published or broadcast – and it may be the only information reported.
- Answer all of the basic questions about your event or project: who, what, where, when, why and how.
- Use simple words and sentences. Explain any complicated or technical terms.
- One press release should describe only one event or project. Write another press release if you have another story to report.

Follow up a press release with a telephone call or visit to the newspaper, or radio or television station. You can then check if your press release was received, gauge interest, and discuss when the release may be printed or broadcast.

(Based on pinx. "Press Pack.")

PRESS RELEASE

BIBLIOTECA AMBIENTAL PARA NIÑOS

Environmental Library for Children
National Museum of Natural History
Guatemala City

Release Date: 15 October 1998

- Give your press release an interesting and original title
- Start with a short sentence that summarizes your event or project
- Personalize the story by including quotes
- A separate page of "Editor's Notes" may be attached with background information and further details
- If your event or project offers the opportunity for photographs, state "Photo Opportunity"
- Write "More Follows" if the release continues on additional pages

(Based on pinx. "Press Pack.")

Children Discover Our Natural Magic

Register your child for a magical experience at the Environmental Library for Children!

Today, Lorena Calvo, Director of the Environmental Library for Children at the National Museum of Natural History announced a new series of children's courses to begin in January. "The future of our society depends on the capacity of children and youth to read, write, and investigate," said Calvo. "The Library offers the opportunity to experience the magic of nature as well as its important functions." Courses are designed to stimulate the imagination, encourage investigation of environmental themes, and discover important ecological connections.

Register by 30 November for these exciting environmental courses:

- For ages 2-5, there are stories and activities that introduce colors, shapes, sounds, and many other curiosities of the natural world.
- Four to 12-year-olds investigate how animals adapt to their natural environment.
- Young ecologists, ages 7-12, participate in direct observation of nature to learn about conservation and career choices in the environmental field.

Register soon to ensure a place for your child. The Library encourages the participation of parents, and even offers special courses for parents and teachers.

Though biological diversity in Guatemala is exceptional and there is a wide variety of species of plants and animals, we are losing some of this variety everyday. The Library, coordinated by the Center for Biodiversity Conservation of Guatemala, was opened in 1995 to raise awareness about this critical issue. Library memberships are available, offering reduced rates for courses; access to a reference library with children's stories, discovery boxes, educational games; and the bimonthly bulletin, "Nature Explorer" with information about wildlife and educational activities to do at home. You can also celebrate birthdays, and Mothers' and Fathers' days at the Library!

For more information about registration and membership at the Library, call 502 472 3612.

ENDS

BEST COPY AVAILABLE

Children on the Radio

Child-to-Child is a non-governmental organization with an approach to health education in which children help to spread ideas about improving health practices at home, in school, and in the community. Activities target younger children, peers, and family members. One way that children spread their message is on the radio. Broadcasts include radio plays, reading letters on the radio, quiz shows, and interviews. Radio Uganda in Kampala goes to participating schools to record prepared poems, plays, songs and discussions about a specific health topic. They edit the recordings at the studio and broadcast the children's work. A radio producer said, "The children love to hear their own voices. So do the parents. In fact parents have told me how much they are learning from the children."

These same ideas are possible for broadcasting messages about "environmental health," addressing the value of biodiversity, problems the community faces due to its loss, and children's ideas of what to do to improve their environment and their lives.

Some ideas from Child-to-Child:

- To get started, make contacts with people who can help you with the technical aspects of recording and can help you get programs on the radio. Talk to someone in a community group with connections or talk to the owner or producer at a local or national radio station.
- To sell your ideas, be prepared to describe what your broadcast would sound like on the radio and what makes it special. Radio stations always need new ideas and they might like yours!
- If you have a cassette recorder with a built-in microphone, recordings can be made for practice, to send to another school, or as a demonstration tape for a radio station.
- Most recordings for radio should be made by someone from a radio station with equipment to produce broadcast-quality sound.

(Hanbury and McCrum n.d.)

While mass media has the potential to reach a large number of people, it is only effective if the message is broadcast accurately and can be understood by your ***target audience***. In places where a number of different languages or dialects are spoken, you may need to produce several different stories or broadcasts to accommodate this. Limited space and time in the press often necessitates shortening statements or pulling them out of context. This can result in misrepresentation of the message you wish to convey. If you want to reach the community through the media, it is important to cultivate relationships with journalists and producers. The better informed these people are about an issue, the more accurately they are likely to portray it. If possible, review news stories before they are printed or broadcast.

Examples of Mass Media Activities

- Write a weekly newspaper column on environmental topics.
- In areas where newspapers are not distributed, news may be posted on a wall.
- Work with a local newspaper on weekly supplements, including activities for students and teachers.
- Educational radio or newspaper series may attract attention by entertaining through dramatization. You can supplement such series by facilitating discussions among groups of listeners or readers.
- Promote an art, poetry, or composition contest based on an environmental issue. Publicize the winners through the media.
- Host a game show on the radio or on television that challenges participants' knowledge about the environment.
- Work with a popular singer or musician to write and perform a song with an environmental theme.

Exhibits

Stationary exhibits

Exhibits can be displayed in other locations besides your interpretive center such as: the public square, school, town hall, post office, health clinic, store window, power or telephone company offices, or the market. These exhibits may be updated or rotated among locations. In some cases, you may wish to staff the exhibit or conduct a demonstration at the site. With unstaffed exhibits, some factors to consider are:

- You may have little control over who comes to see the exhibit.
- Measures should be taken to protect exhibits from weather conditions and vandalism.
- Exhibits should be checked regularly for maintenance or repairs.
- You may need to ask permission to place an exhibit or display in a public area or building.

For any exhibits used in community outreach, the same guidelines for developing written or visual material for exhibits at your center apply. *See Unit 2: "Interpretive Exhibits."*

Traveling exhibits

Exhibits or presentations can also be designed to travel. Traveling shows go where people are, rather than requiring the audience to come to them. Traveling exhibits can include:

- Simple traveling displays (e.g., displays printed on fabric or folding screens)

- Mobile conservation education units, equipped with films and slide shows
  See the case study describing a mobile unit program around the Kinabalu Park in Malaysia, Unit 5, page 172.
- Mobile classrooms and libraries

In developing traveling exhibits, special consideration should be given to:

- Potential costs of transportation, travel time, equipment, vehicle and exhibit maintenance
- Portability of the exhibit
- Durability of the exhibit; traveling exhibits may be subject to damage in transit or assembly
- Value of materials: if you plan to lend out the exhibit, how can you ensure it will be returned?

A wildlife education box or ecology trunk is another type of traveling exhibit. This box or trunk contains instructions and materials for educational activities as well as "scientific field equipment" such as small magnifying glasses, field guides, and field notebooks. It is advisable to begin with one or two boxes as a pilot project; more boxes may be assembled according to the level of interest and the budget available for materials, training, and management of the program. You or your staff can take these educational boxes to schools, clubs, or community groups, or you can lend them to teachers or other leaders. If others will use the boxes, it is important that they receive training

Protecting Visual Aids

It is important to keep copies of artwork. Avoid lending your only copy of anything! When not in use, store photos, slides, or other materials in a cool, dark, and dry place. Slides, photographs, and negatives may be stored in a box or filing tray. In an atmosphere-controlled building (not subject to extreme heat or cold), archive-quality plastic storage pages are an ideal way to organize slides for storage. However, polyvinylchloride (PVC) pages should be avoided; they emit a harmful gas that over time may destroy slides, prints, and negatives. (PVC pages are recognizable by their strong plastic smell.)

An air-tight container made of metal is ideal for the safe storage of photographic materials and electrical equipment (e.g., cameras, lenses, slide projectors). In humid climates, silica gel can be used to absorb moisture from the air. It can be purchased in bulk quantities at pharmacies or medical supply stores, or in small, sealed packets at camera shops. Silica gel tends to lose its absorbency after a month or two; in extremely humid conditions, it may take only a matter of days. Gentle heating in an oven or over a fire will dehydrate the crystals and restore their moisture absorption capacities.

Never touch the surface of slides, prints, or negatives with your fingers. Always hold them by a corner or wear cotton gloves. In a dry climate, a fine-bristle brush may be used to remove dust from slides. In a humid climate, moisture allows mold and bacteria to grow which may destroy the slide. Slides should be cleaned periodically using ethyl alcohol or a liquid slide cleaner which may be found at a photography store. This liquid should be applied lightly to the non-emulsion surface of the slide using a cotton swab and then wiped with a dry swab. The emulsion (less shiny) side of the slide is delicate and easily scratched and should only be dusted lightly.

Audio- and videotapes require similar care. When not in use, store tapes upright in their cases in a cool, dry place (sachets of silica gel crystals can be put into the storage cases to protect tapes from moisture). Avoid bringing tapes in contact with strong magnetic fields, such as may be produced by a motor, generator, or transformer. Magnetic fields can erase information stored on tapes.

Precision and electrical equipment (e.g., slide projectors, microscopes, video recorders, binoculars) should always be stored in dry conditions and kept at a constant cool temperature. A paint brush, fine-bristle brush or pressurized air jet can be used to clean dust and fluff from equipment. Pressurized air in small cans with nozzles is available from photography stores and computer shops.

(Ham 1992, 389-395.)

on how to use the activities and how to properly care for the equipment. Teachers need to feel comfortable using the objects themselves before they feel confident to teach with them! In addition, teachers, club leaders, and others should be involved in developing the contents of the box to ensure that it includes the things they really need to lead environmental education activities. Enclose an evaluation or feedback form, so that you can learn from borrowers how they use the materials in the box and how the boxes might be improved.

Ecology Trunks

At Ranomafana National Park in eastern Madagascar, ecology trunks designed by park staff and a Peace Corps volunteer offer environmental education materials and methods in a form that is simple and portable. Trained teachers use these trunks to bring environmental education to remote villages on the periphery of the park. The goal of the program is to increase the understanding of teachers, students, and other residents concerning Madagascar's rainforests and the value of biodiversity. Items in the trunks include:

- Written curriculum materials
- Malagasy lore relating to rainforests and their inhabitants
- Objects such as animal skulls and teeth
- Photographs
- Identification cards with pictures and descriptions of Madagascar's unique flora and fauna
- Research tools, such as a magnifying glass, inexpensive binoculars, maps
- Malagasy and English translations

Activities in the ecology trunks are designed to build on different skills while introducing environmental concepts and to help people learn about the park project and scientific research. Park staff held a training workshop for teachers in the region and also traveled to other sites in Madagascar to talk to Peace Corps Volunteers and their counterparts about incorporating ecology trunks into environmental programs as well as into basic education and English-as-a-Foreign-Language programs.

Presentations

Audiovisual presentations

Audiovisual presentations include slide shows, filmstrips, and videos. Portable audiovisual presentations can be very effective in bringing your message to the community with pictures and sounds that people might not otherwise have an opportunity to encounter. Explore sources for equipment that meets your needs and is appropriate for your area *(see box on opposite page)*. Some inexpensive battery-operated slide projectors, film projectors, and video recorders are available. When acquiring audiovisual materials, make sure that a film or videotape is compatible with the equipment you have to show it. To operate an audiovisual presentation, you will need a power source. In the absence of electricity, you can use rechargeable batteries, a electricity generator (petrol or diesel powered) or solar panels. *For suppliers of videos and slide projector equipment see Appendix 4D: "Resources for Community Outreach."*

Appropriate Technology in Pakistan

In a project promoting the conservation of Siberian cranes in Pakistan, audiovisual materials were developed for filmstrip projectors. However, it was soon discovered that such projectors were seldom found in the region. The Wildlife Department and Pakistan Forestry Institute staff had access to filmstrip projectors, but found them difficult to transport over bumpy roads. Project staff also discovered that technology in rural Pakistan had skipped the filmstrip and 16-mm film projector and made the transition directly to video:

"We have learned that audiovisual materials have great appeal and utility where illiteracy is high and televisions are few. However, the technological age has raised the expectations of audiences to higher levels – even in rural areas – and it is important that audiovisual programs be of high quality with evocative visual images and local dialect narration."

(Landfried et al. 1995, 121-155.)

Dramatic performances

Dramatic performances such as singing, storytelling, dancing, puppet shows, or theatrical productions are traditional forms of communication in many cultures. Where oral means of communication predominate over written communication, such performances can have an especially powerful impact on people's attitudes and behavior. Dramatic performances also allow performers to deal with controversial issues they might not otherwise be able to present.

Assess whether dramatic performances are used to communicate and entertain in your community, and whether these would be appropriate means to convey a message about conservation. Work with community members who are skilled in drama and who will best be able to relate a conservation message in a culturally appropriate way. *See Unit 3: "Interpretive Presentations," pages 95 - 97 for further information about dramatic performances, and Appendix 4C: "Creating a Puppet Show" for a guide to making puppets and theaters.*

As with most other community outreach activities, dramatic presentations are most effective in transmitting messages to an audience when combined with other activities and with follow-up discussion emphasizing a similar message.

Role-playing is a participatory form of dramatic performance, in which individuals take on a role for the purposes of discussion. A scenario is presented and roles may be designated by a facilitator, or participants may help decide what roles should be included in the activity. As different points of view are represented, role-playing can help to clarify areas of controversy. Participants must consider different perspectives and often have a good time taking on a role that opposes their personal stance on an issue. *See Appendix 4A: "Facilitating Discussions."*

Seabird Conservation

On the north shore of the Gulf of St. Lawrence in Quebec, Canada seabird populations were threatened by overhunting. Hunting of the birds was difficult to regulate because of aspects of geography, local tradition, and a changing economy. Education was thus an important component for reducing the threat to the seabird population. Many of the communities in the region are remote and offered few after-school activities to compete with the proposed environmental education project. Making use of this advantage, in one community that was hostile to conservation agents and their programs, a staff member of the Quebec-Labrador Foundation* produced a play for the children to act out. These children, who were the sons and daughters of poachers, played the parts of seabirds. As they practiced their parts at home, the parents also heard the message about seabird biology and conservation.

The dramatization of seabirds by children of hunters was both entertaining and effective in communicating a conservation message to different segments of the community. This activity, along with conservation clubs, classroom resources, and a variety of informational materials (including a poster, calendar, radio programs, and a citizen's guide to regulations protecting seabirds) contributes to achieving the project's goals of:

- Increasing population levels of seabirds nesting in sanctuaries
- Increasing knowledge, enhancing attitudes, and improving hunting behavior of residents
- Increasing local support for and involvement in the environmental management process

* The Quebec-Labrador Foundation is a non-profit U.S. and Canadian organization working in collaboration with the Canadian Wildlife Service on a seabird management plan.

(Blanchard 1995, 51-63.)

Environmental and Ecology Clubs

Clubs can be effective in engaging community members in environmental issues and organizing action to improve the community's natural environment. Many existing clubs, such as the Lions and Rotary Clubs or agricultural cooperatives may be interested in taking on environmental projects. In other cases, conservation associations or volunteer stewardship groups might be organized in the community.

Youth clubs can be instrumental in developing valuable leadership skills that will serve youth and the community well in dealing with future environmental problems. Involve a motivated teacher or other community member in facilitating club or camp meetings and activities if possible. Consider working on special projects, activities, or presentations with existing clubs or camps in the community, such as boy or girl scouts, or other youth organizations.

Ecology Camp in New York City

The Central Park Conservancy in New York City organized a summer youth ecology camp for inner city children who live near Central Park, but had never visited it. Over the course of the summer, a group of students explored the park, learning about how urban parks contribute to the well being of city-dwellers. The children often took short-cuts between paths, thereby adding to erosion and soil compaction problems in the park.

Consequently, the summer camp instructors devised an experiment in which the children took a can with both ends removed and inserted it into the ground in the middle of their favorite short-cut. The children poured a cup of water into the can and timed how long it took for the soil to absorb the water. They replicated the procedure in good soil and saw how much faster the water was absorbed in aerated soil compared with the compacted soil.

As a group, the children decided to rehabilitate the short-cut. They broke up the hard soil, mixed in compost, laid jute, and planted seeds to help reduce siltation in the stream below. The children also spoke with people who were using other short-cuts between paths, explaining why it is better to stay on maintained paths.

Special Events

Special events increase public awareness of an environmental issue and motivate people to participate by focusing their attention on a particular issue. Your center can be site for a festival or tree-planting to commemorate World Environment Day (June 5), Earth Day (April 22), or a national holiday. You can invite community members to an "open house"; they are welcome to visit throughout the day or the afternoon and find out about your programs. People are often willing to come out for a special occasion that promises to offer food and entertainment along with an environmental message. You may also consider looking for sponsorship for a festival or concert, or make it a fund-raiser by charging admission or suggesting a donation. Even if an event is a "work day," such as a beach or park clean up or litter collection day, people may be willing to help if it means improving their town or recreation area.

Some important considerations in planning for events include:

- **Permission**
  Do you need to ask permission to hold the event?
  Is approval necessary to post announcements or advertise?
- **Admission fees**
  How and when will fees be collected?
  Do you have personnel or volunteers who are trustworthy and capable of handling the money?
- **Crowd control**
  Can you partner with local police or emergency services to manage the event?
- **Safety**
  Can the local hospital provide a mobile first-aid station, first-aid staff, or an ambulance on stand-by?
  Does your event site or interpretive center have adequate exits and fire extinguishers in the case of a fire?
  Does your organization or interpretive center have the necessary public insurance or public liabilities policy?

You might also find opportunities to participate in events held or sponsored by other organizations. Such events offer the possibility of reaching audiences already assembled for a national day, environment day, traditional celebration, or other community gathering. These events may also receive significant attention from the government, community leaders, and journalists. Consider the following in planning environmental education activities as part of a larger event:

- How can you attract attention to your message amidst the numerous activities occurring at the event?
- How can enthusiasm generated during the event be sustained?

Other Outreach Media

Posters, T-shirts, calendars, key chains, stickers, and stamps are popular items that can convey simple messages. Using a logo that is easily recognizable, these items help familiarize people with your center and its mission, attract attention to a particular event, or reinforce an environmental message.

Postage stamps, for example, are small, but widely used items. Consider working on a design in collaboration with the postal service and together devise a campaign to publicize the stamps and what they represent.

Some items are costly to produce. To cover expenses, you might sell T-shirts or posters as a fund-raiser. You can also seek sponsorship or

donations from local businesses or development agencies that have an interest in what you do, as well as publicity they will gain – especially if items display their names or logos. Be sure to research potential sponsors, as their positions on human rights or environmental issues will be associated with yours if you dis-play their logos on your products.

For any product you choose it is crucial to have a distribution plan; estimate how many products you can give away or sell. You should also weigh the benefits of a particular product with the possible negative impact of its production on the environment. Look for suppliers who use recycled or organic materials. Finally, is your product effectively raising environmental awareness or might it actually add to environmental problems by encouraging people to buy something they do not really need?

There are numerous communication channels from which to choose, but you should not feel that you have to use them all. The means of communication you select should support your message; use of media can attract interest, but the focus should always be on the message, not on the media itself. Do not spend time and money to make an elaborate presentation if simple interpersonal communication would be just as, or more, effective. Always ask yourself, "What is the most efficient and effective means to reach my community and involve them in biodiversity conservation?"

Species Conservation Campaigns

Stickers, posters, and other items can be especially effective in publicizing conservation efforts to save a particular species or place. This strategy has been used effectively in the Caribbean for bird conservation campaigns as well as in Brazil for the golden lion tamarin. These campaigns focus on a bird or primate as symbol of a conservation program and build on feelings of national pride.

The RARE Center for Tropical Conservation uses business marketing methods to build local support for conservation, generally by focusing on a national bird such as Belize's keel-billed toucan *(Ramphastos sulfuratus)* or St. Lucia's Amazon parrot, known as the Jacquot *(Amazona versicolor)*. RARE's save-the-bird campaigns work best in places where local communities are not already saturated with marketing pitches, and where the prevailing attitude about the environment is apathy, rather than politically-charged resentment.

In the Golden Lion Tamarin Project in Brazil, T-shirts, stickers, and buttons have been given as rewards for contributing to conservation, used for local fundraising, and serve as reminders of the larger conservation message that is communicated through a wide variety of activities.

(RARE project information: Belleville 1995, 16-21. Golden Lion Tamarin information: Dietz and Nagagata 1995, 64-68.)

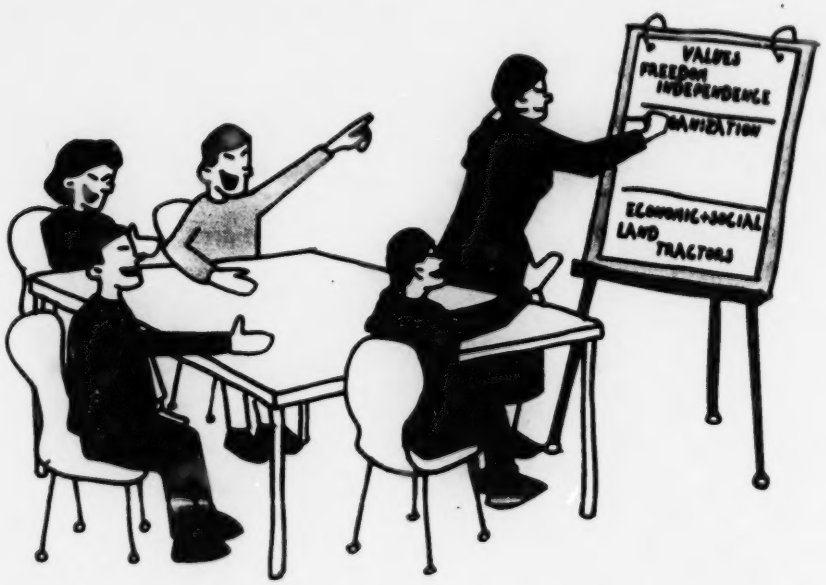
Appendix 4A Facilitating Discussions

Bringing people together to discuss issues in their communities often uncovers barriers to collaboration due to differences in status and points of view. Though addressing controversial issues in the community may be very difficult, conflicts that arise can be used constructively. Allowing people to express opposing views can generate ideas, bring clarity to a situation, and produce decisions based on the "whole picture" rather than a narrow aspect of a problem. It is essential that conflict be handled in a way that facilitates consensus building, or coming to a collective decision. Maintain the focus on the issues, rather than blaming people; depersonalize the debate. Encourage all stakeholders – those who have an interest, or stake, in the implementation and/or outcome of a project – to take responsibility. Remember that as a facilitator, your job is not to solve problems, but to mobilize community members to solve problems themselves.

Brainstorming

One way to get conversation started is to have a **brainstorming** session. This means that everyone in the group calls out ideas to be added to a list. You will need a chalkboard or large pieces of paper to record ideas as people say them. (With non-literate audiences, this activity may be adapted by using pictures.) The rules for brainstorming are:

- No criticism is allowed during brainstorming.



- Ideas should be recorded as they are stated, without editing.
- Encourage farfetched ideas; they may trigger more practical thoughts.
- The more ideas the better.

(Crone and St. John Hunter 1980, 58-59.)

Ask the group what they think of when they hear the word, biodiversity; brainstorm causes or effects of an environmental issue in the community, such as erosion or deforestation; or have a brainstorming session to identify what people think are the most important environmental issues in the community. Ask a member of the group to record responses as the rest of the group calls them out. When it seems that the group has run out of ideas, review the list together. Cross out words that the group decides do not fit. Seek consensus on key words, concepts, or issues that emerge through the process. This list can then be used to discuss priorities for action.

Team Building

When working with a group of people who may be intimidated by differences in status within the group, it is important to break down the sense of hierarchy so that group members can work together. An activity that helps to do this begins with participants moving around the meeting area and greeting everyone without talking. When everyone has made non-verbal contact, ask each person to find a partner and, without speaking, communicate a piece of information to that person. Have each pair join another pair and communicate silently as a group of four. Discuss participants' reactions to the experience. In one case where this activity was used, participants commented that they became aware of how a non-verbal show of approval can be encouraging and inspire greater participation.

(Crone and St. John Hunter 1980, 15.)

It is also important to identify what people have in common and work on addressing areas of disagreement or conflict. An activity that allows people to explore their perceptions of their own interests and learn about the interests of others can lead to better communication and collaboration in the larger group. For example, ask individuals or small groups to collect or list five things representing their country or their village. When all the items are assembled, the whole group can discuss them and select five or six that best represent them. These might include such things as crafts (textiles, basketry, carvings), foods (rice, fruit, spices), musical instruments, or any other items that symbolize the livelihood, culture, or history of the area. The same type of activity can be used to explore what the forest means to individuals or the community. Individuals or groups may list clean air, clean water, or fuelwood, or bring in objects such as coffee beans, rope, or fodder. The list or collection of objects can form the basis for discussion of the variety

of things the forest has to offer or to discuss what people value most about the forest. This activity works best with people who understand symbols – either words or objects – to represent concepts.

Role-playing

With biodiversity conservation, questions arise such as "for whom and by whom is biodiversity conserved?" and "who benefits from and who bears the costs of biodiversity conservation?" In your community, there are likely to be some very different points of view regarding these questions. ***Role-playing*** is a way to generate discussion by having participants take on roles that represent a different perspective than their own. Begin by identifying a specific issue for the role-play; this may be a hypothetical scenario or one that is related to topics that came up in brainstorming.

For example, the director of the national park service has called a village meeting to discuss the establishment of a national park to protect the forest that the village borders. Staff of the park service and conservation organizations have been surveying the area to identify species that live there, to study the forest's value as a watershed for the region, and to talk to villagers about their use of forest resources. There has been a lot of tension between the villagers and the researchers. The director hopes that discussion with the villagers will help to address some of their concerns about the project.

List the roles and prepare role cards for each, describing primary objectives and issues for each role. The following are examples; there are many other roles and characteristics that you might select.

Roles

- **Director of the national park service:** Feels that protecting the forest is essential; it may be difficult for local people now, but in the long run they will benefit from conservation of their natural resources.
- **Technical advisor for a conservation organization:** Has been called in by the government as a consultant; knows that the forest in question is home to several unique species found nowhere else in the world; also aware of being an outsider in the discussion.

- **Extension agent:** Knows the people of the region well; has been working in the community to encourage conservation and adoption of alternative agricultural techniques.
- **Village chief:** Remembers when the forest was much larger and fuelwood and fodder were more plentiful; concerned about the well being of the villagers.
- **Village woman:** Collects fuelwood and fodder from the forest.
- **Farmer:** Cultivates a small plot of land that barely produces enough to feed his family; takes cattle into the forest to graze.
- **Hotel owner:** Sees the park as an opportunity to increase business dramatically; advocates road improvements to bring in more tourist traffic.

Roles may be distributed randomly to participants, but no one should play his or her own identity (in order to ensure that participants explore other perspectives). Alternatively, roles may be assigned by consensus or based on who would be most appropriate for a given part. Present a scenario that is relevant to the situation faced by the group or community, but avoid making it too exact – allow the participants to have enough "distance" to feel comfortable discussing the issue. Give participants about ten minutes to think about their roles and write down some ideas they can refer to in discussion. Make sure that everyone understands his or her role. Begin discussion by having participants identify themselves (their roles) to the rest of the group. As the one who called the meeting, the director might start off the discussion. The facilitator should participate as little as possible, only entering discussion if there is an impasse or to keep the discussion on the issue.

The role-play can conclude after a previously agreed-upon amount of time or when it seems to naturally reach a conclusion. A follow-up discussion is essential. Take a break for about five minutes to allow participants to distance themselves from their roles before beginning a discussion. Ask each participant how he or she felt. Was the role-play realistic? Why or why not?

Large groups may be divided into smaller ones to enact a role-play, each working on the same scenario or on different ones. The whole group can come together afterward to compare experiences. Alternatively, some members of the group can play out the roles while others observe. Depending on the scenario and the time available, a role-play may involve several actors, as in the example above; or it may be a dialog such as an encounter between a park manager and a local farmer. When they are finished, participants should first share their thoughts, then observers can comment, and the whole group can discuss what they learned.

(Center for International Education 1986, 30-31; World Resources Institute and the Centre for Environment Education 1997, 39-43.)

Appendix 4B Creating a Slide Show

Slide shows are among the most economically efficient and educationally effective tools available to people with limited resources. You can take them almost anywhere as long as you have a power source – electricity or a portable battery. These presentations require a slide projector, a screen (any white or pale plain background can be used, such as a sheet of fabric, a board, a wall), and some kind of audio explanation of the slides, usually a live narrator or a recording of the narration. Music and sound effects can be used to enhance the listener's understanding and enjoyment of the images. Four main steps are involved in the production of a slide program:

- Preparing the text (script)
- Planning the visuals
- Obtaining the slides
- Producing the sound track

Preparing the Text

Begin production of your slide show by creating a script. Generally, a slide presentation should be about 15 to 20 minutes for a seated audience and five minutes for a standing audience. Therefore, it is essential that the narration is concise and focused on a clear message. Make your script compelling; use a conversational style and incorporate language that evokes an emotional response. A strong introduction prepares the audience for the main argument that will follow. Each section of the narration should include a transitional passage to move smoothly from one slide to the next.

While recorded narration and live talks are made up of similar parts – an introduction, the body of the argument, and a conclusion – there are some crucial differences in their production. A live narrator can respond to audience feedback, while this is not possible with a recorded narration. Whether live or recorded, the narrator should speak slowly and clearly to heighten the emotion and drama. A script for live narration should include signals for the reader's voice inflection such as italics for emphasis and ellipses (...) for pauses. Practice the script several times and then perform it to get feedback from an audience. It is essential to test a recorded narration with an audience before making the final recording. *For additional information on writing scripts and giving presentations see Unit 3: "Interpretive Presentations."*

Techniques to Enhance your Script

- Introduce the narrator as an object or animal directly involved in the environmental issues discussed (always with sensitivity to cultural implications).

EXAMPLE: An endangered animal narrates a discussion of the decline of its species due to habitat destruction and hunting.

- Insert recordings or scenes of live coverage of the problems being addressed.

EXAMPLE: A slide of fires covering a hillside to illustrate the loss of forest cover.

- Include several different voices in the narration to personalize historical stories.

EXAMPLES: A man explains how soil erosion has impoverished his once fertile fields.
A child offers an account of the flood that destroyed her home.
A woman explains how cutting down mangroves has affected her shrimp catch.

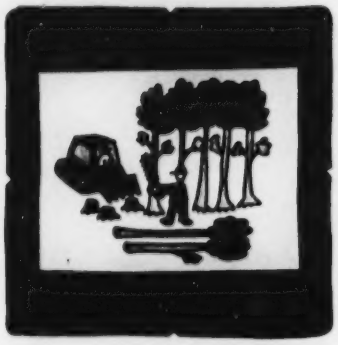
A Sample Slide Show Plan

Audio	Format / Details	Slide
Music (show first slide) /1/	Title Slide	#1 Our Rainforests
Rainforests are crucial for the survival of our planet /2/ Background noise of forest		
They recycle a large percentage of the air we exhale into clean air for us to use again /3/	Aerial view of a rainforest	#2
They also serve as homes to many rare and exotic species of plants and animals /4/ ...	Close-up of slide #2	#3

Planning the Visuals

After you have prepared a draft script, organize the slides that will accompany the narration. Arrange them in a sequence according to your slide show plan or mark the change of slides directly on to the script. Utilize the most effective picture to accompany the narration ideas; pictures can enhance the meaning of words tremendously. Consider different types of slide illustrations – literal, representational, graphic, and symbolic – for example:

Literal: A picture of a forest that has been cut down to illustrate deforestation



Representational: A park entrance sign to represent the whole park

Graphic: A map illustrating human population in African countries

Symbolic: A Dodo as a symbol for extinct species

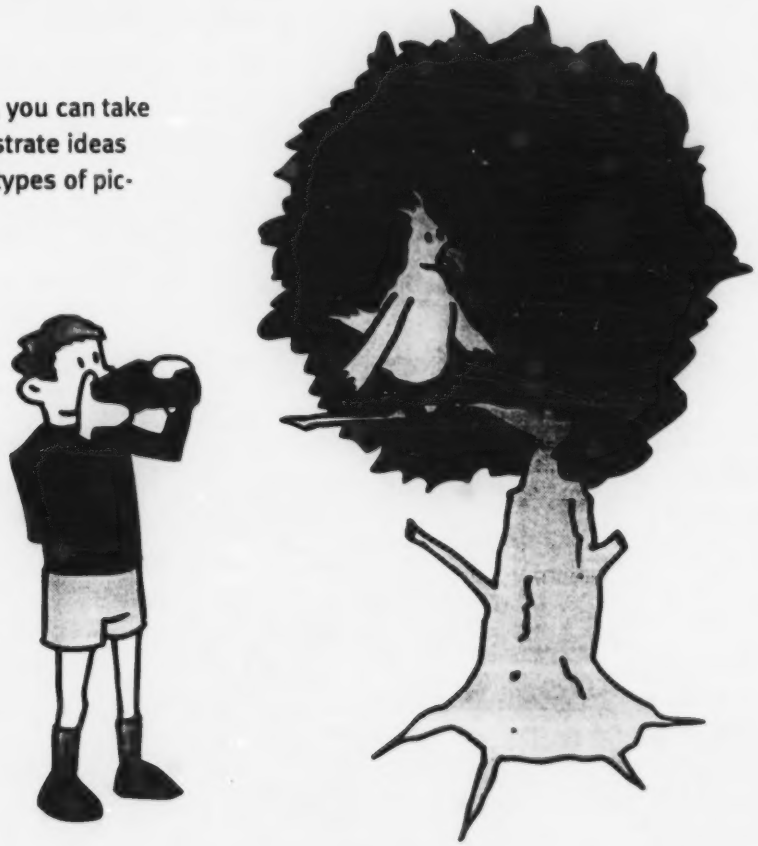
You may find that you need to modify or refine the script as you line up the visuals. (Remember to acknowledge the source of your pictures at the end of the production, either by stating their names or with a slide listing those who should be credited.)

Obtaining the Slides

Slides for a presentation can be produced or obtained in a number of ways. Some ideas are outlined below:

Take your own slides

If you have access to a camera, you can take pictures for slides yourself to illustrate ideas you want to present. A variety of types of pictures will add interest to your slide presentation. Take several shots of each subject from various angles and using different camera settings to ensure that you will have a selection of good quality slides from which to choose. *See the box on the facing page for basic guidelines on photography.*



Photography

When selecting film consider the light conditions you will encounter when taking pictures. Check the "ASA" value on the film packaging. ASA values indicate the light sensitivity of the film and range from 25 to 1600, or from low to high light sensitivity. Common values are:

- 400 ASA: film with high light sensitivity for use in low light conditions (e.g., underneath a forest canopy, in shade, on a cloudy day)
- 200 ASA: a general film for all light conditions
- 100 ASA: film with low light sensitivity for use in bright light (e.g., in bright sunlight, in snow, on or near water)

It is important to adjust your camera to fit the film's ASA value; some cameras are adjusted automatically, while others have settings that must be selected manually.

Single lens reflex (SLR) cameras (automatic, semi-automatic, or manual) represent a common standard for quality slide and print photography, and are widely used by both professionals and amateurs. With automatic SLRs some or all of the photography functions (e.g., aperture size, shutter speed, exposure, and focus - see below) are controlled automatically by the camera. On a manual SLR adjustments must be made by the photographer before taking the shot. This offers greater scope for flexibility and creativity as camera operating functions can be set separately to suit the subject matter, the situation, and the style of the shot required.

Basic Photography Terms

Aperture Size – The aperture is the adjustable opening in a camera lens that admits light. Aperture size is measured in f-stops. The lower the figure the larger the aperture size: 1.7, 2.8 and 4 are large apertures; 16 and 22 are small apertures.

Shutter Speed – The shutter is the device that opens and closes within a camera to allow light to enter. Shutter speed is measured in fractions of a second: at 1000, the shutter opens and closes in 1/1000th of a second; at 60, the shutter moves at a much slower speed (1/60th of a second.)

Exposure – Exposure occurs when light reaches the film. Film is under-exposed when insufficient light reaches it and over-exposed if subjected to excessive levels of light.

Focus – Focus is achieved by adjusting the camera lens to produce a clear photographic image.

The aperture size and the shutter speed control the amount of light that enters the camera. The two functions should be used in combination to obtain optimal exposure or to achieve desired visual effects. For example, when photographing in bright sunlight, you could use a fast shutter speed and/or a small aperture to limit the amount of light entering the camera.

There is a direct relationship between shutter speed and aperture calibrations (e.g., to allow more light into the camera you could either open the aperture by one calibration or slow the shutter speed by one calibration. Both actions would have the same exposure result). Before taking a photograph, measure light conditions with a light meter, and adjust the aperture and shutter speed accordingly.

Depth of Field – The size of the aperture not only influences the amount of light entering the camera, it also affects the "depth of field." Depth of field is the area of acceptable sharpness in front of and behind the point of focus. Depth of field distances are usually indicated in meters and feet on the camera lens alongside the aperture values:

- A large aperture (1.7, 2.8, or 4) produces a short depth of field; only a small proportion of the shot around the focused object is in sharp focus.
- A small aperture (16 or 22) results in a long depth of field; a greater proportion of the shot around the focused object is sharp.

Action Shots – When photographing moving objects consider the type of visual result that you wish to obtain. A wide variety of effects can be achieved by adjusting the shutter speed:

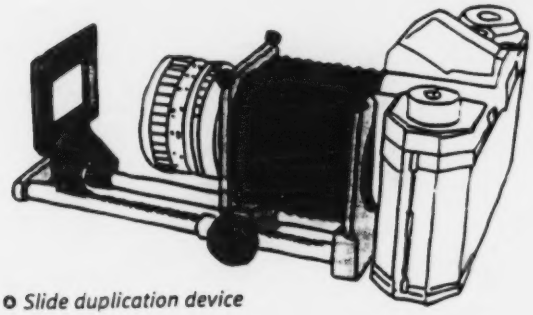
- A fast shutter speed (1000 or 500) "freezes" a moving object, making it appear in sharp focus.
- A slow shutter speed (125 or 60) can make a moving object appear as a "motion" blur, creating an impression of movement or speed.
- To obtain a shot where the moving object is sharp and the background has a "motion" blur, the object must be followed with the camera using a slow shutter speed. A tripod may be needed for this technique.

For wildlife photography, you will need camera equipment that allows you to work with different light conditions and distances from your subject. It is useful to have a flash, a tripod, and a range of different camera lenses, including telephoto objectives or a zoom.

BEST COPY AVAILABLE

Copy, buy, or borrow slides

Photographic copies can be made of slides. These "slide to slide" copies are made at a photography shop or you can make copies yourself using a slide duplication device that fits over the lens of your camera. When copying slides, either yourself or at a shop, check copyright regulations covering the original images.



o *Slide duplication device*

It is often possible to buy or borrow slide images from other organizations, and some of the larger conservation bodies (e.g., WWF – World Wide Fund for Nature, IUCN – The World Conservation Union) have extensive photo libraries with standard slide sets for sale. Images can also be purchased from professional photography agencies. Agency catalogues can be ordered free of charge allowing you to view the full selection of images before buying.

Make a slide from a print

It is possible to produce a slide image from a print photograph. This is done at a photography shop or studio, using the original negative of the print. The process is more expensive than developing slides directly from ordinary slide film.

Produce slide graphics on a computer

Illustrations for slides, such as graphs, line drawings, maps, charts, diagrams, and texts, can be produced on a computer. The images need to be created or scaled down on the computer to the correct size to fit into a slide frame (3.5 cm x 1.5 cm). They can be produced in black and white or color, and must be printed out on a clear transparency film designed for ink-jet and laser printers. The printed images can then be cut and fitted into plastic slide frames ready for projection. When producing illustrations on a computer for slides, it is advisable to make graphics simple and clear with minimal text.

Produce illustrations for slides by hand

If you do not have access to a computer, illustrations such as graphs, line drawings, maps, charts, diagrams, and texts, can be produced by hand. *See Appendix 1C: "Visual Media for Interpretation."* As with computer produced

illustrations, keep hand drawn graphics simple with minimal text. For best results draw images on white paper. Using slide film, take photos from above in good light conditions (if possible, in bright daylight). Take several shots of each graphic varying the camera aperture by one position above and below that indicated on your light meter. In this way you are likely to obtain at least one good slide. Be careful not to let your shadow or other shadows fall across the graphic while taking the photographs.

Producing the Soundtrack

To produce a basic soundtrack, you need a tape recorder and a microphone (using an external microphone helps to minimize recording noises that may be picked up by an internal microphone). Find an isolated recording location. A small, quiet place with minimal echo is best.

If you wish to incorporate background sounds (e.g., music, bird song, running water, ocean waves) into your soundtrack, it is generally best to pre-record these sound effects on a different tape player beforehand. This will then allow you to record the narration while you add in the background sounds. Be sure to adjust your tape recorder for the proper balance; narration should be easily understood over the background music or sound effects.

It may be possible to produce your soundtrack at a professional recording studio. Perhaps a studio will produce the soundtrack for free or at a reduced rate as a donation to your project. Radio (and sometimes television) stations are often willing to help non-profits with the production of soundtracks.

Adjusting Your Tape Recorder

If there is a volume meter on the tape recorder, adjust it so that when you speak the needle is just touching the red zone. If your tape recorder has an "auto/manual" switch for volume, select auto so that the recorder adjusts itself for different levels of sound input. Choice of music and/or background sound effects are important elements for consideration at this stage. Also, remember to use the pause button and the volume control when recording, this will help you to blend in different sound and narration elements and to achieve smooth transitions between sequences.

(Ham 1992, 350-370.)

Appendix 4C Creating a Puppet Show

Puppet shows are a terrific way to get your message across to a variety of audiences, as people of all ages like to watch them. Puppets can joke or complain, be silly or wise, sad or happy and still attract attention to a message. In this way, puppet characters can also talk about subjects that might be difficult to address more directly.

Scripts for puppet shows are relatively easy to prepare if you keep a few basic ideas in mind. The messages and the dialog must be short, simple, and relevant to the audience. The more action the puppets engage in, the more people will be interested in the show. Puppets can be inexpensive to make, depending on how simple or elaborate you make them. It helps to give an expressive face to the puppets, and to give them eyes and colorful clothes or bodies.

Making Paper Maché Puppets

Materials

Newspaper
Water and flour mixed to make glue paste
Fabric
Needle and thread
Oil paint
Glue
Scissors

Instructions

1. Start with a well-compacted ball of newspaper.
2. Add layers of newspaper strips using the flour and water paste.
3. Create a form more or less the size of an egg, then sculpt the nose and other features of the face if necessary. Use your finger to make a hole at the base of the paper ball. Let the ball dry.
4. When the ball has dried and hardened, you can paint it. Start with the base color and paint different faces for the characters in your script.
5. Cut two pieces of fabric (see graphic) and sew them together leaving holes at the top and bottom, as well as at the end of the arms. This will form the body of the puppet. Make hands for the puppet using pieces of wood or cardboard and attach them to the arms with glue.
6. Glue the puppet's head to the top of the glove. When you make the puppet move you can support its head by inserting your index finger into the hole at the base of the head. Three fingers suffice for working the puppet – one moves the head and the two others move the arms.

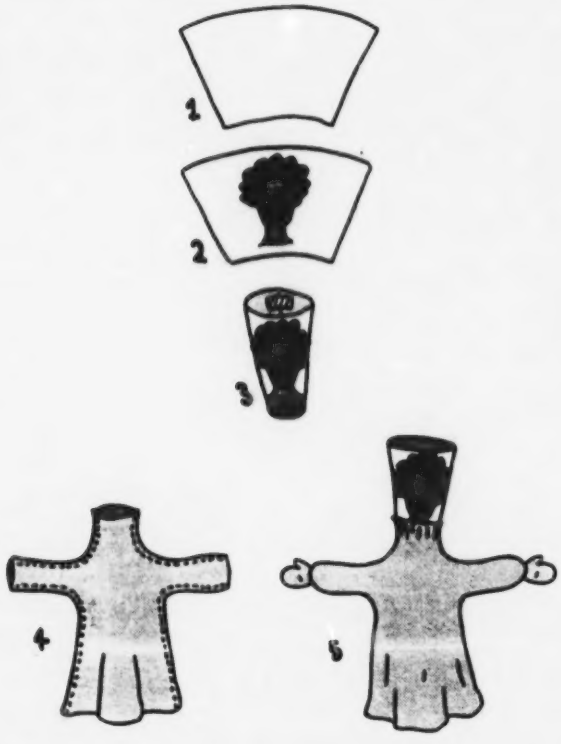
Instructions

1. Cut the paper or cardboard as shown below.
2. Draw or paint the face and neck at the center of the paper.
3. Make a cone with the paper and close the ends with tape or glue. This will be the puppet's head.
4. Cut two pieces of fabric as shown and sew them together, leaving holes at the top and bottom as well as at the end of the arms. This will form the body of the puppet. Make hands for the puppet using pieces of wood or cardboard and attach them to the arms with glue.
5. Glue the paper cone to the interior of the top hole in the glove. The puppet is ready to play!

Making Simple Puppets

Materials

Paper or cardboard
Glue or cellophane tape ("scotch tape")
Fabric
Needle and thread
Pens, paint or color crayons
Scissors



Making Stick Puppets

Materials

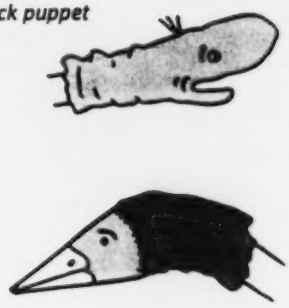
Cardboard
Sticks
Glue or cellophane tape ("scotch tape")
Pens, paint or color crayons
Scissors

Instructions

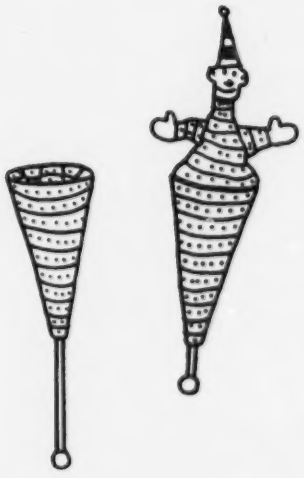
1. Cut out the form of the character and draw or paint a face and other details on one side of the cardboard.
2. Attach the stick behind the cardboard character with glue or tape.
3. The puppet is ready to go!

Other Puppets

Glove or sock puppet



Cone puppet



String puppet

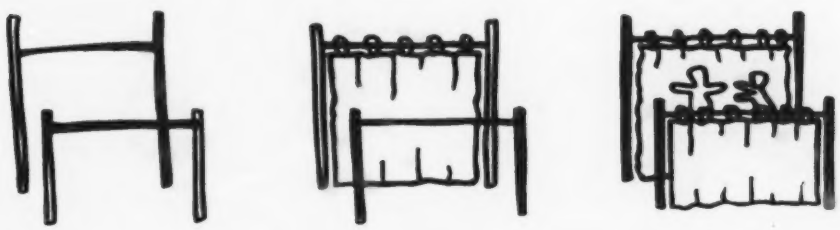
Making Puppet Theaters

Materials

Poles (bamboo canes, metal rods, wooden stakes, straight branches)
String
Fabric
Needle and thread
Plastic or metal rings

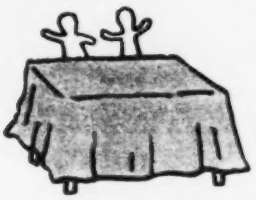
Instructions

1. Cut two poles about 10 cm taller than the head of the tallest puppeteer; these poles will form the front drop or puppet stage.
2. Cut two other poles about 60 cm above the head of the tallest puppet, when the puppets are in position behind the front drop. These poles will form the backdrop or theater background.
3. Place the poles in the ground, the shortest pair in front, as indicated in the drawing below. Extend string between the pairs of poles at both heights.
4. Cut two pieces of fabric large enough for curtains.
5. Hang the curtains from the strings, either by using rings or by passing the string through a fold of fabric.



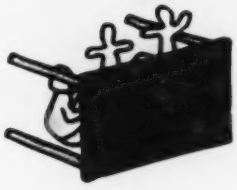
Simple Puppet Theaters

Table covered with a cloth



Cardboard box or crate

Table on its side



Important points to remember when staging a puppet show:

- Project your voice loudly and speak slowly and clearly.
- Make sure that all the accessories you need for the play are ready and accessible.
- It is simplest if each puppeteer plays only one puppet role.
- Use sound effects, if possible.
- Read from scripts during the show only if necessary. Try to memorize your puppet's part.
- Move the puppets when they speak so that the audience can tell the characters apart.

Appendix 4D Resources for Community Outreach

Center for International Education. 1986. *Teacher Training: A Reference Manual.* Washington, DC: Peace Corps Information Collection and Exchange. (Reprint available from ERIC Document Reproduction Service)
Role-plays.

Crone, Catherine D., and Carman St. John Hunter. 1980. *From the Field: Tested Participatory Activities for Trainers.* New York: World Education. World Education, 1414 Sixth Ave., New York 10019, USA.
Excellent activities for identifying needs or problems, stimulating questions, and storytelling.

Ham, Sam H. 1992. *Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets.* Golden, Colorado: North American Press.
Protecting visual aids.

Hanbury, Clare, and Sarah McCrum. n.d. *We are on the Radio.* London: The Child-to-Child Trust. The Child-to-Child Trust, Institute of Education, 20 Bedford Way, London, WC1H 0AL, United Kingdom. Tel: +44 171 612 6650 Fax: +44 171 612 6645
A booklet designed to introduce adult organizers to the basic skills needed to plan a broadcast for children, to develop children's radio skills, and to contact people who can help produce broadcasts.

Hudson, Wendy E., ed. 1992. *Naturewatch: A Resource for Enhancing Wildlife Viewing Areas.* A Defender's of Wildlife Publication. Helena, Montana: Falcon Press.
Forming partnerships.

Jacobson, Susan J. 1995. *Conserving Wildlife: International Education and Communication Approaches.* New York: Columbia University Press.
Presents a model for effective conservation education and communication programs, including planning, implementation, and evaluation. Fifteen case studies from around the world cover the topics: conserving natural areas, protecting declining species, targeting resource users, programming for schools, and involving community groups. The cases were selected on the basis of systematic collection of data that enabled authors to identify approaches and components that contributed to the success of the programs.

Wood, David S., and Diane Walton Wood. 1988. *Conservation Education: A Planning Guide* Washington, DC: Peace Corps Information Collection and Exchange.
Strengths and weaknesses of various educational strategies that may be used for community outreach.

World Resources Institute and the Centre for Environment Education. 1997. *Issues in Biodiversity: Conservation for Whom?* Biodiversity. Enviroscope: A Manual for College Teachers. Delhi: Oxford University Press, (pages 39-43.)
Role plays.

Facilitating Group Discussions

Fox, Helen. 1989. *Nonformal Education Manual.* Washington, DC: Peace Corps Information Collection and Exchange.
Techniques for working with groups.

Srinivasan, Lyra. 1993. *Tools for Community Participation: A Manual for Training Trainers in Participatory Techniques.* Washington, DC: PROWWESS/UNDP-World Bank Water and Sanitation Program.
Available in English, French, and Spanish.

Srinivasan, Lyra. 1992. *Options for Educators: A Monograph for Decision Makers on Alternative Participatory Strategies.* New York: PACT/CDS, Inc.
Community mapping.

Werner, David, and Bill Bower. 1995. *Helping Health Workers Learn.* 10th ed. Berkeley, California: The Hesperian Foundation.
Describes a variety of methods for appropriate and participatory community-level training.

Materials and Supplies

Conservation Education Consultants (CEC)
Mark Boulton (Director)
Brocklebank, Butts Lane, Woodmancote,
Cheltenham, GL52 4QH, United Kingdom.
Tel/Fax: +44 1242 674 839
E-mail: markcec@aol.com
Slide projectors designed for remote and rugged locations, batteries, electrical and solar powered battery chargers.

Radmar, Inc.
1263 Rand Road, Suite B
Des Plains, IL 60016, USA.
Tel: +1 847 298 7980 Fax: +1 847 298 1248
E-mail: radmarx@msn.com
Battery-powered slide and filmstrip projectors and audio cassette recorders; filmstrips in English and Spanish.

TVE Moving Pictures Distribution Centre
Television Trust for the Environment (TVE)
Prince Albert Road, London, NW1 4RZ
United Kingdom.
Tel: +44 171 585 5526 Fax: +44 171 586 4866
Films are available to TV stations, non-governmental organizations and other educational organizations in low- and middle-income countries.

The Evaluation Process

UNIT 5

The Evaluation Process

Evaluation is the process of making a judgment about the worth of something. This judgment is based on evidence collected to determine if certain objectives have been met. In order to ensure that your interpretive program is having the desired effect, you need to know which activities work and which do not – and you need to know why.

While observations may suggest that your interpretive program is having an impact on the audience – "more people attended my presentation this week than last week," "participants told me they had a good time," "community groups have expressed an interest in a reforestation project" – it is essential to systematically collect ***data*** (factual information) to understand why this is occurring. ***Evaluation*** is often overlooked in environmental interpretive programs, in part because it takes time and money, but also because many people feel like they do not have the expertise to carry out an evaluation. Though it is not necessary to have extensive training in order to do evaluation, it is important to understand why you are evaluating and to follow some basic steps.

This unit describes the basic principles of evaluation and provides some real-life examples. It is not, however, designed to be a comprehensive document on evaluation, as a number of excellent resources exist with detailed guidelines for developing and implementing evaluations. *A list of such resources is included in Appendix 5: "Resources for Evaluations."*

Why Evaluate?

Evaluation is about making improvements. Perhaps you want to improve your overall interpretive program or assess the effectiveness of particular exhibits or presentations within your program. Evaluation can help you design

a new activity or evaluate an existing one. Information from a program or activity evaluation can be used to do the following:

- **Document activities**
  What activities were carried out?
  Were they well presented?
  Which activities were most effective in meeting the objectives?
- **Measure impact**
  What is the impact of the program on the target audience?
  What environmental changes have been recorded since the program began?
- **Track resources**
  What supplies, personnel time, and money were used and what were they used for?
- **Check efficiency of resource allocation**
  How does resource use relate to results?
- **Report to funding agencies or potential donors**
  Did the program meet donor expectations?
  Are additional resources needed to continue the program?

Evaluation identifies **what** you have accomplished, helps to identify **why** you were successful or less than successful, and gives clues as to **how** to improve.

Evaluation as a process takes place before, during, and after a program or an activity is implemented. Before you design an interpretive program or activity, evaluation can help you decide what activities would be most appropriate to implement. This involves assessing the needs of your prospective audience(s) and identifying ways that education can address biodiversity conservation issues. This aspect of evaluation is called ***needs assessment*** and is a critical component of program development. *It is discussed in Unit 1: "Program Development," page 19.*

Evaluating as you go along, or during program implementation, measures your progress. This process, called ***formative evaluation***, seeks to answer such questions as: Do planned activities actually occur? What progress is being made? How well is the program functioning, and what modifications should be made?

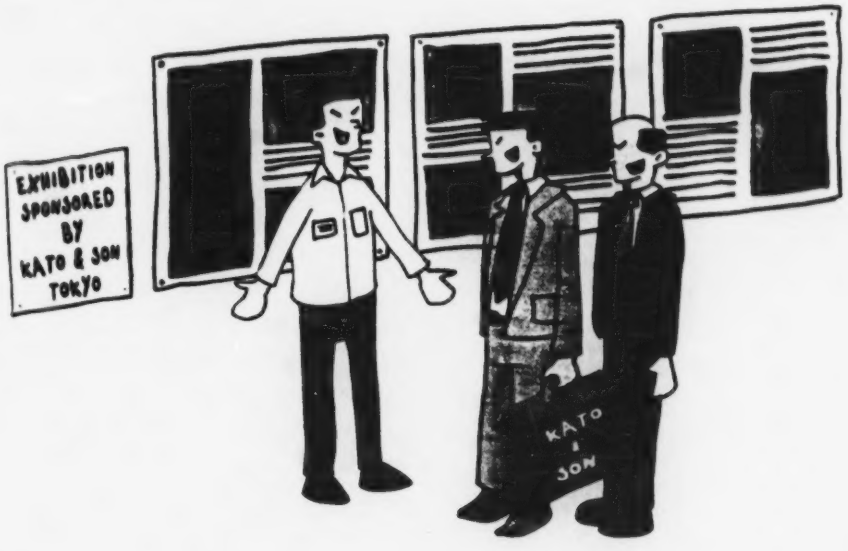
Summative evaluation, or evaluating after a program or activity is completed, measures the end result (and compares it with the initial situation). This helps to determine whether you are meeting your goals and objectives, and whether there should be changes in design or implementation of your program or activities.

Think about target audiences for the evaluation information. Make a list of all the people who will be directly or indirectly affected by the evaluation of an activity or program. Some groups who may be on your list of audiences for the evaluation results include:

- **You and your staff** have a stake in how the center is doing because you are all responsible for the successes or shortcomings of the products or services provided by the center. The people who are most responsible or work directly on the program being evaluated should be involved in the evaluation process.

- **The public** will want to know what you did with all the information you collected through surveys, questionnaires, and tests. Information sharing builds goodwill by demonstrating to the audiences that you care about their needs and desires. It also provides an opportunity for you to show that your programs are run professionally and that you value the input of others. By sharing information, you will also encourage interest and participation in future evaluations.
- **Peers and professional organizations** want to share in your successes and learn from your experiences. They may be able to provide you with insight as to how to design your evaluation, where to look for materials or expertise, and how to incorporate the suggested changes.
- **Donors** want to know that their financial contributions have been used effectively. They often require evaluation reports at regular intervals. You need to justify to them that your programs are worth supporting. Evaluations are also very important for demonstrating to **potential donors** what you can do.

Making a list like this helps determine the type of evaluation you will undertake and what you will do with the results. In the process, you may also identify people or organizations that you have not previously considered who should be involved or who may be valuable resources for further program development.



Basic Steps for Evaluation

Whether you are evaluating a particular activity or the overall interpretive program that is made up of several activities, you need to include the following steps:

1. Determine evaluation questions
2. Decide the scope of your evaluation
3. Choose the method of information collection
4. Analyze the data and interpret the results
5. Communicate the evaluation results and act on them

In this unit, we present these as a series of steps in the evaluation process. However, in reality these steps often overlap; in fact, it is important to consider each step in relation to the others. Too often evaluations emphasize design and implementation, but overlook analysis and application of the findings.

1. Determine Evaluation Questions

In order to design an evaluation you should have a clear idea of your program goals and objectives. The questions you answer through evaluation are drawn from these original statements of what it is you set out to accomplish. Did you set clear goals and objectives when you planned your program and activities? Recall the SMART characteristics of an objective: Specific, Measurable, Appropriate, Realistic, Timebound. Revisit your goals and objectives to refine or revise them before beginning your evaluation. *See Unit 1: "Program Development," page 22.* Your program or activity will be difficult to evaluate if you have:

- Unclear or trivial goals
- Objectives that are too broad or are not measurable
- Objectives that are unrelated to your stated goals

A goal is a broad statement summarizing what you would like to accomplish.

An objective is a statement that describes one aspect of how the goal is to be accomplished. Generally, several objectives are necessary to accomplish a goal. Objectives state what, when, and how it will be done.

2. Decide the Scope of Your Evaluation

It is important that you identify what resources are available to you in terms of money, materials, time, and personnel (including their skills or expertise). This will assist you in deciding what size and type of evaluation you can carry out.

Resources

- How much money is budgeted for evaluation?
- Can you apply for additional funding?
- What materials will you need for a particular method of evaluation?

  Perhaps pen and paper is all that is required to record responses to interview questions, or you may decide that a tape recorder is preferable to record a large number of responses. To cover a large area, you may need to rent or buy a vehicle or bicycle or cover costs of travel by public transportation. A computer is helpful for data entry, processing and analysis, and for writing reports.

- How much staff time can be devoted to evaluation?
- How much time will respondents to questionnaires or interviews be willing to spend recording or discussing their comments?
- What is the time frame for evaluation? Are there reporting deadlines set by donors?
- How many staff members are available?
- What are the relevant skills of your staff or other resource people?
- Is an outside perspective desirable, such as that of a consultant who is not directly involved personally or financially in your programs? If so, are funds available for consultant fees?

The following is an example of a basic resource inventory for an evaluation:

Needs	Available Resources	Comments
Money	$200 budgeted for evaluation	
Materials	Office supplies: notebooks, pens, typewriter	Ask Professor Lo at the university about access to a computer, printer, and the Internet.
	Interview equipment: cassette tape recorder, blank cassettes, batteries, two bicycles	Do we need a car for interviews in Red Hill?
	Photocopy machine available at the bookstore	Can we negotiate a price for a large number of copies?
Time	Fiscal year report due 30 September	Interviews must be completed by 15 July
Personnel	Six staff and volunteers	Relevant skills Tour guide: good observation skills, could help design and conduct interviews. Extension officer and volunteer: good with people, could do interviews. Volunteer: detail-oriented, could help compile data. Accountant: data entry, computer skills. Project consultant: statistical analysis.

Size

The size of your evaluation depends on the number of evaluation questions, the number and complexity of methods used, the number of information sources (e.g., respondents, observations, documents), and the number of occasions for data collection. For example, one day devoted to gathering information from 20 visitors can provide some valuable insights for activity planning, although it may not draw from a representative sample of all visitors. *See box below for definitions and information on sampling.* Much more time – weeks or months – may be devoted to testing and revising exhibits to make sure that visitors understand your program message and the way in which you convey it.

Sampling Strategies

To evaluate the impact of an interpretive program or activity, you need to identify the units you will measure. A **unit** is the smallest object or individual that can be investigated. Depending on what you are doing, a unit may be a village, a household, an individual, a hectare, or a tree. The collection of all of these units is a **population.** All of the units in the population must have at least one thing in common (e.g., households in a village, women who gather fuelwood, hectares of forest cover, trees of a particular species).

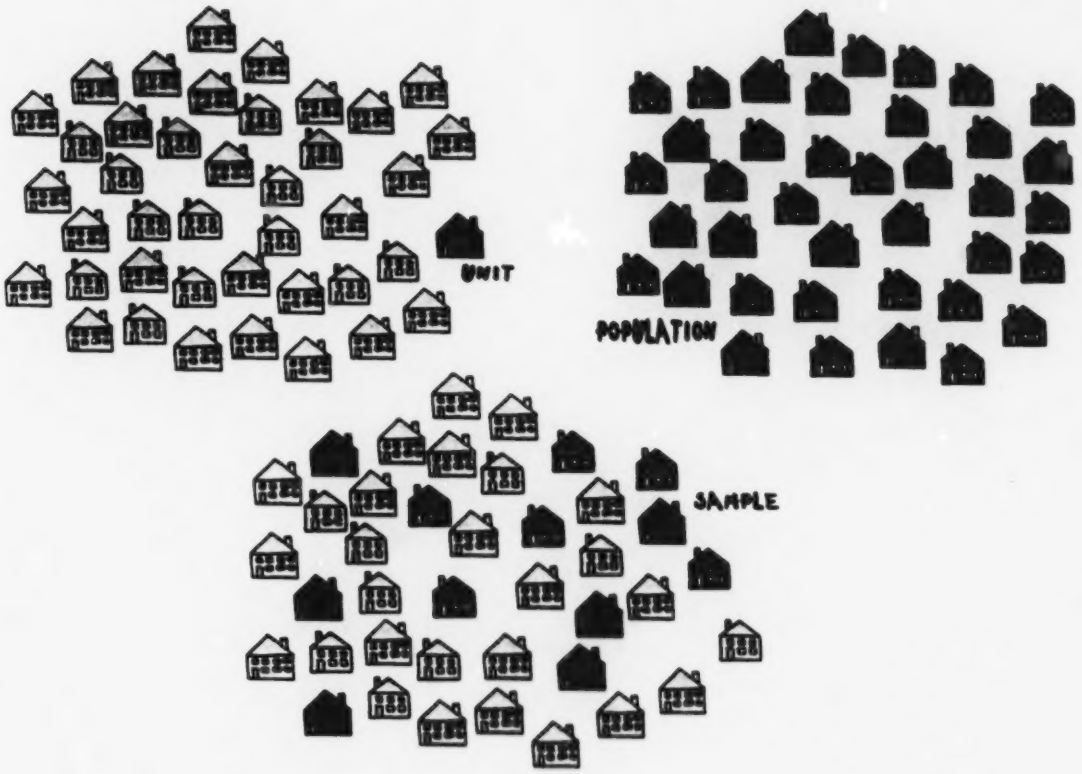
In some cases it is desirable and feasible to include all of the units in a population in your evaluation. For example, if you wish to measure change in household consumption of fuelwood as a result of an educational campaign, you can conduct a survey of all 20 households in a village. With a larger population, this is much more difficult. If you want to better understand the impact of your interpretive programs on household behavior in the region consisting of 20 villages, it would take you a long time to visit every household. In this case, it is better to survey a group, or **sample,** of all of the households. The sample must be selected systematically to ensure that it represents your population. The information derived from the sample can then be generalized for the total population.

The size of the sample you select will depend on what you are able to handle and the accuracy desired. In general, with a small population (50 or less) use the entire population. For up to 1,000, consider a sample size of 30% of the total population. Above 1,000, the percentage of the total population may be decreased.

A sample must be selected in a way that ensures that it represents the total population and avoids any bias. In a randomly selected sample, this means that all members of the population have an equal chance of being selected – often from a list. Stratified random sampling is similar, but the population is first divided based on some characteristic, such as age, income, or level of education. A random sample is then selected from each subgroup.

In an environmental interpretation program, units will often relate to human populations, as in the example of household consumption of fuelwood. However, the number of hectares of forest lost – or replanted – per year may also indicate changes in the environment relating to the goal of your interpretive program.

(Margoluis and Salafsky 1998, 121-126.)



3. Choose the Method of Information Collection

There are some important general considerations in selecting an evaluation method. They include:

- **Accuracy and reliability**
  Accuracy refers to the degree of error in the data collection. How much error is acceptable?
  Reliability means that the same method could be used again to attain the same results.
- **Cost-effectiveness**
  Consider the trade-off between how accurate and reliable the method is and how much money and other resources are available for doing the evaluation.
- **Feasibility**
  Which evaluation methods are feasible given the skills and time constraints that you and/or your staff have?
- **Appropriateness**
  Is the evaluation method the most effective for what you want or need to do?

Is the method appropriate for the given environmental and cultural context? (e.g., Can remote villages be reached for interviews? Are any of the questions likely to offend respondents?)
Is the method you select for information collection compatible with the technique that you propose to use for analysis and interpretation of the final data and results?

(Margoluis and Salafsky 1998, 96-99.)

With these criteria in mind, consider the type of data that will supply the information you need and how you will go about collecting these data through evaluation. ***Quantitative data*** are expressed in numbers and can be

manipulated statistically. They include tabulations of frequency, percentages, and averages. Results are generalizable.

Qualitative data express opinions, feelings, observations, and behavior changes. These data are not expressed in numbers, but may provide more depth and detail than numbers do. Evaluations based on both quantitative information and qualitative statements often reveal more than evaluations that are based on only one or the other. In some cases, the numbers are important for reporting to funders or administrators, while the detailed information about specific audiences revealed by qualitative data is valuable for program improvement. Some methods for collecting qualitative and quantitative data are described here.

Quantitative data collection methods

Quantitative data collection methods enable you to track project records such as financial information, resources used, number of participants, or other things that can be counted. Quantitative methods described here are questionnaires, structured interviews, and documentation.

A **questionnaire** consists of a series of written questions. It should be concise, requiring only a few minutes for a respondent to complete. Questions can be designed for a "yes" or "no" response, fill-in-the-blank, or ranked on a scale (e.g., from one to five or ranging from agree to disagree). In designing a questionnaire, consider each question carefully (e.g., Why am I asking this question? How will I use the information I get from asking this question?). Revise your questionnaire to include only the essential questions (avoid asking too many questions). It is crucial that the questions elicit the information that you need.

Tips for Writing Questions

- Think about how each question relates to the information you need to measure whether you have met your goals and objectives.
- Use vocabulary that is easily understood by respondents.
- Be careful in phrasing questions about sensitive issues.

Questionnaire respondents must be literate. Questionnaires are easy to administer to a large number of people, making it a relatively time efficient method. They also ensure anonymity of respondents. Uniformity of responses makes results easy to summarize and interpret. Though it may be more time-consuming to analyze, consider adding a qualitative dimension to the questionnaire. If you leave space at the end for comments, you may gain additional insights from visitors' responses.

A **structured interview** is a standardized approach to the collection of information from individuals or groups. The interview relies on structured questioning of a sample of the population that is surveyed. Consider questions carefully as in a questionnaire. The evaluator interviews respondents by asking a series of prepared questions and recording the answers (generally by writing them down, but a tape recorder may also be used). Questions must be asked in the same way of every respondent. An interviewer should be trained to record the in-formation accurately and not to lead the respondent inadvertently into selecting a certain answer.

Documentation can provide a variety of information: the number of visitors that attend a presentation or visit exhibits, the cost of designing and implementing a program, or the number and types of presentations that were given during a specified day, week, or month. Data collected can build on existing records, and add to baseline information about the community and the environment. Standard documentation forms can be designed so that they are easy for staff and volunteers to complete routinely, are pertinent to the information you would like to track, and can be compared over time.

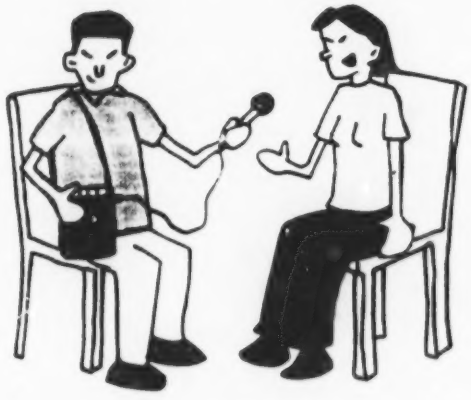
Qualitative data collection methods

Qualitative data collection methods enable you to describe people's knowledge, attitudes, or behaviors. Qualitative methods described here are observations, interviews, and focus groups.

Observation is a method by which you can gather first-hand data on programs, processes, and behaviors, and record your observations. You can collect data on a wide range of behaviors, explore an evaluation topic, and gain an understanding of the context in which a program or activity occurs. This method is relatively easy to learn because we all make observations in our daily lives. However, training and practice may be necessary in order to ensure that observations are unbiased and recorded in an accurate and systematic way. For example, when following visitors through an exhibition (as unobtrusively as possible), use a floor plan to track their movements and make notes about their behavior and how long they spend in different locations. Observations can be ***cross checked***, or compared, with results from other evaluation methods. You can make preliminary observations of visitors to an exhibit and follow up with a survey or identify a sample for in-depth interviews in order to determine whether your observations represent typical behaviors, and to better interpret the visitor behavior you observed. Observations are useful at all stages of evaluation – before, during, and after program or activity implementation.

An **in-depth interview** does not follow the rigid form of the structured interview. This method utilizes open-ended questions to capture the perspectives of participants, providing in-depth information on specific topics. It is best if the information is taken down word for word and not paraphrased by the interviewer, as meanings and relationships may be lost and information may not be as easily sorted and analyzed. A tape recorder is ideal for conducting this type of interview.

In-depth interviews may be conducted with **key informants,** rather than a sample that is representative of the population. A key informant is not necessarily identified as one whose opinions reflect those of the larger population; rather he or she is an individual who you think will have particular insight.



A **focus group** combines elements of observations and interviews. A focus group generally consists of a small number of people (approximately six to eight) who agree to meet as a group to discuss specified topics. A moderator asks open-ended questions, allowing respondents to answer in any way they wish, rather than choosing from a selection of answers. A focus group moderator must be skilled in managing a group and working with the dynamics that evolve among individuals in the course of discussion. In addition to participants' statements, a moderator should observe social interactions and body language of individuals. Focus groups can elicit opinions about what participants liked and did not like about your center's activities and provide valuable suggestions that may be used to develop or modify activities. Information gleaned from focus groups may be detailed, but use caution in generalizing these results due to the small sample size.

Following are some examples of quantitative and qualitative methods for evaluating interpretive exhibits, presentations, and community outreach programs.

Evaluating exhibits

Structured and in-depth interviews and questionnaires are instrumental before, during, and after developing exhibits. Survey potential audiences to find ways to appeal to their inter-

ests and needs. For example, to plan an exhibition on water, several groups of audiences could be sampled: visitors to the museum, students at a nearby high school or university, people at the marketplace or on a downtown street corner. In a study of this kind conducted in California, respondents in all of the groups surveyed used the word "reservoir" when asked where their water comes from. Exhibit planners could then use this as a focus for discussion in the exhibition of other aspects of the topic, such as: water sources – how water gets to the reservoir; water quality – how nature provides a natural filtering system; water use – how water level in the reservoir goes up and down at different times of the year.
(Serrell 1996, 138.)

Vocabulary

"Do visitors understand the term, 'ecosystem' and can we use it in an exhibit without defining it?" To answer this question, you could test a large sample (n=200) using a questionnaire or structured interviews to en-able you to make a generalization about the percent of your audience that understands the term "ecosystem." Alternately, you could question a smaller sample (n=15-25) using in-depth interviews or focus groups to get qualitative data about what visitors associate with the term.
(Serrell 1996, 136.)

Interviewing a small sample of people can provide valuable information for exhibit development. However, it is important to bear in mind that conclusions that apply to one exhibit may not necessarily be relevant to another exhibit situation. In some cases, a small sample may be drawn from a group of people with similar characteristics because this group has been identified as a target audience. In other cases, it is desirable to draw from a more diverse population (in age, gender, social group) to represent more perspectives.

Summative evaluation of exhibits (interviews, questionnaires, observations) allows for the study of "exhibit impact" on your audiences. It is also useful for testing the effectiveness of your displays, messages, texts, graphics and hands-on activities against the objectives originally identified in exhibition planning. A simple way to collect audience reactions to an exhibition is to position a comments box or visitor book at the exit of your interpretive center.

Visitor interviews need not be complicated or take a lot of time. To evaluate visitor response to an exhibit, one of the most useful questions to ask is, "What do you think this exhibit is about?" An exhibit that does not provoke an appropriate response to this question is probably not meeting the objectives you have set for it. (Serrell 1990.)

Observing visitor behavior in an exhibition can reveal interesting things about how they respond to content and design. How much time do visitors spend in the exhibition? What is their behavior in the exhibition; do they read, talk about what they see, touch or pick up objects that are on display? In which sections do visitors spend the most time? It may be difficult to track visitors without their being aware, and possibly disturbed, by your presence. Because people may behave differently when they know they are being watched, an observer might pose as a participant in an activity. However, to eavesdrop and record people's conversations may be considered an infringement of their privacy. One solution is to post a sign, stating: "We are observing visitors in the exhibition area today in order to improve exhibits for your next visit. If you do not wish to be observed, please return at another time." (Taylor 1991, 60-63.)

Evaluating presentations

The same evaluation methods may be used to assess your audience's interest in topics and vocabulary comprehension for presentations. When you plan your presentation, state objectives for what you aim to achieve, such as, "After the tour, visitors will be able to name two medicinal plants that are unique to the protected forest and describe how these plants are used by local people to treat illnesses." Stating such objectives enables you to maintain a focus in preparing your presentation. Though you may not ask visitors to answer questions about what they learned every time you present, you can be sure to emphasize main points based on your objectives.

You can also conduct an evaluation following a presentation with a simple questionnaire that audience members fill out and leave in a box. Alternatively, you can use stamped postcards with your address that visitors mail back to you after they leave. This kind of evaluation can tell you whether your audience liked your presentation and whether they learned from it.

Sample Postcard Questionnaire

Please take a few minutes to help us improve our program!

Tell us about your visit and yourself.
Date of visit: .....

Number of people in your group who attended this presentation and their ages: .....

Your residence: city .....
state .....

Name of presentation you attended:

.....

On the back, please evaluate this presentation.

Forest Park Interpretive Center
Box 100
Forest Park, Western State

Front

Presentation Evaluation

I learned a lot from this presentation.
(select one) ☐ strongly agree ☐ agree ☐ neutral ☐ disagree ☐ strongly disagree

The presentation was interesting.
(select one) ☐ strongly agree ☐ agree ☐ neutral ☐ disagree ☐ strongly disagree

The things I liked most about the presentation were

.....

.....

The things I liked least about the presentation were

.....

.....

I would like to learn more about

.....

.....

Back

(Adapted from Regnier, Gross, and Zimmerman 1994, 95.)

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A **self-evaluation** is one in which the educator documents information about his or her own performance. It can be as simple as noting what went well or what could be improved in a particular activity. You may also make written notes or use a prepared checklist to do this. Self-evaluations are relatively easy to do in the course of regular work responsibilities, but generally should be followed by an evaluation by a colleague or supervisor, if possible.

Self-evaluation Form

Date _____
Group name _____
Length of presentation _____
Number in the group _____
Interpreter(s) _____
Purpose of visit or program (visitors' expectations)

Objectives (what will visitors learn during the presentation?)

Outline of program
Introduction

Main points (or stops on a tour)

Conclusion

Evaluation
In your opinion, was the presentation successful?
Did you do everything you intended to?
What was the visitor response?

What were the presentation strengths?
Were you well-prepared?
Was your style engaging?

What improvements could be made (in the presentation plan or delivery)?

(Adapted from Regnier, Gross, and Zimmerman 1994, 92.)

Another way to evaluate a presentation is to undertake a **mentor evaluation**, where a colleague or supervisor (i.e., the mentor) observes a presenter at work. The mentor critiques the presenter's technique and style, and the effectiveness of the presentation. In a mentor evaluation, the evaluator should discuss this critique with the presenter, rather than simply handing over the completed evaluation form. An evaluator who is truly a mentor provides a good model in his or her own environmental interpretation. When observing, a good evaluator:

- Does not appear at a presentation unexpectedly (the presenter may not know the exact time that he or she will be observed, but should at least be notified of the possibility).
- Is not obtrusive (allows the presenter to do the presentation without interjecting comments or suggestions; does not wear a uniform or look "official").

In discussion with the presenter, the evaluator:

- Identifies the positive aspects of the presentation and the presenter's delivery, provides constructive criticism, offering suggestions and alternatives.
- Has a helpful, unintimidating attitude, assisting the presenter in seeing the possibilities for growth and improvement.
- Listens to the opinions of the presenter and helps him or her to be a self-critic.

(Regnier, Gross, and Zimmerman 1994, 93.)

Example Mentor Checklist Items

Interpretive qualities:
Did the presenter
- Relate to something in the experience of the audience and involve the audience?
- Inform as well as interpret information and inspire the audience?
- Involve the whole person – intellect, emotions, motivation to take action?

Organization:
Did the presentation have
- An attention-getting introduction?
- A well-defined message?
- Good flow, linking the introduction to ideas presented and to the conclusion?
- An appropriate length?

Technique:
Did the presenter
- Make the audience feel relaxed and interest them in the topic?
- Connect with the audience through eye contact?
- Encourage and respond to comments and questions?
- Use props or other techniques well?
- Use active language and speak dynamically?
- Have annoying mannerisms?

(Regnier, Gross, and Zimmerman 1994, 94.)

Evaluating community outreach activities

Participatory evaluation is a qualitative approach that involves all stakeholders and interpretive program participants in all phases of evaluation: planning and design, gathering and analyzing data, identifying findings, communicating results, and making an action plan to improve the program. In combination with other evaluation techniques (e.g., questionnaires, interviews, observations), participatory methods can be particularly useful in the assessment and development of community outreach programs. Such methods help you to link your objectives with target groups' needs and interests, allowing for analysis and the building of relationships among program staff and participants. Participatory evaluation can help develop skills in decision-making and self-reliance, as well as encourage trust and responsibility among participants and educators. It is an opportunity not only to examine how well program goals are being met, but also to revisit the goals and to ask whether they are appropriate goals in the first place.

There are many creative, interactive ways of evaluating what participants have learned from an interpretive program or activity. These can be used with community groups as well as with school groups before and after a visit to your interpretive center.

Case Study: Evaluating a Mobile Conservation Program in Malaysia

A mobile unit program consisting of a slide presentation, discussion period, and a wildlife film was designed to travel to the villages surrounding Kinabalu Park in Malaysia. The goal of the project was to foster favorable attitudes toward the park system and to promote conservation of natural resources among the local residents. In the third year of the program, an evaluation was conducted to determine if residents' attitudes had shifted as a result of exposure to the program.

Initially, an oral interview was tested, but several problems with this method were identified. Some villagers wanted to discuss each question, while others were hesitant to respond to questions they felt might have political overtones.

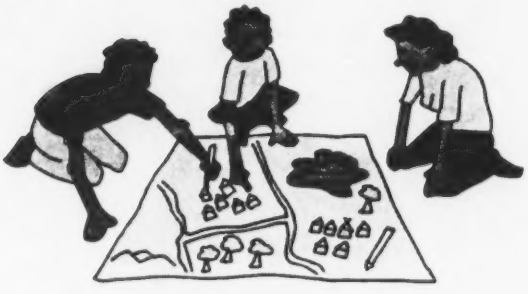
The questions were modified to be administered as a written questionnaire in order to increase the sample size and reduce bias that might be introduced by having Park personnel conduct interviews. Five problematic questions were eliminated and directions for completing the questionnaire were added. The resulting questionnaire consisted of seven "attitude" statements with which respondents could agree or disagree (e.g., "There is no need to keep areas of natural forest"), and six questions used to collect some demographic information about respondents, their resource use, and whether they had ever visited the Park.

This evaluation process showed that the two-hour presentation offered by the mobile unit program was effective in fostering favorable attitude shifts among villagers toward the park system. The process was also instrumental in helping Park staff improve the program's effectiveness. Some negative attitudes that were un-changed by the program were targeted by providing relevant information in subsequent programs. For example, both before and after attending the presentation, a majority of respondents agreed with the statement that the Park was too large. In the future, based on this finding, staff would include information about the need for a large area to support animal populations, and the biological importance of protecting diverse forest types and microhabitats scattered throughout the Park.

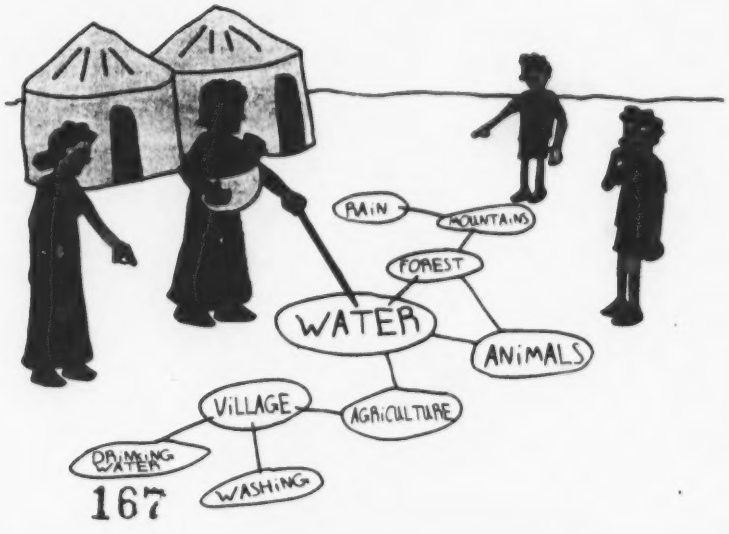
From the sociodemographic information collected, it was possible to target needs of particular audiences. Because a large number of young people attended the program, the style and content could be tailored for their interests.

(Jacobson 1987, 201-206.)

Community mapping begins with a location or area that people already know well. This gives them an opportunity to share the history and the reality of their lives in a visual form. They can add to a map or create their own, illustrating land use patterns, social structure, and relationships between people and wildlife. *See Appendix 1C: "Visual Media for Interpretation."* Everyone can participate – young or old, men or women, literate or not. Once a map is completed, participants may be invited to imagine the kind of changes that may occur, or to alter the map to reflect their ideal for the community or a natural area.



Concept mapping is a variation on drawing maps to illustrate spatial relationships among locations or areas. A concept map illustrates conceptual relationships among ideas or terms. The procedure can be used to compare participant knowledge before and after an interpretive activity or program. Initially, participants are asked to brainstorm words related to a particular topic. *See Appendix 4A: "Facilitating Discussions" for more on brainstorming.* For example, participants can individually or collectively make a list of words related to water. They can then make concept maps that show relationships among the words in the list. Related concepts should be grouped together on the same branch of the map *(see illustration below)*. Concept maps can form the basis of discussion and help you to develop appropriate presentations and activities demonstrating how protecting biodiversity is essential for maintaining the quantity and quality of the water supply. Following the activity or program, participants can draw new concept maps based



on what they learned. Comparison of the pre- and post-activity concept maps is a method of authentic assessment. As an extension of concept mapping to develop language arts skills, participants can use verbs or adjectives to form connections between terms.

Journals, particularly with an ongoing series of activities and presentations, can be kept by participants to record their impressions over time. Encourage participants to think creatively and write about their feelings and attitudes rather than simply recording events chronologically.

Drama and ***role-plays*** can depict how participants feel about their situation (before and after participating in educational activities). These build communication and organization skills as participants work in groups. *See Unit 4: "Community Outreach," page 129, for ideas on dramatic performances, and Appendix 4A: "Facilitating Discussions" for more information on "Role-playing."*

4. Analyze the Data and Interpret the Results

Analysis is the process of organizing and explaining your data, and interpreting them in a way that helps you to better develop and manage your program and report its successes. Data analysis and interpretation should occur as soon as possible after information is collected. You will more accurately remember the context if you do not wait and you can cross check information and fill in gaps as necessary. In fact, you should think about how you will analyze your results when planning your evaluation. The kind of data you want to collect and the methods that you use for collection are related to the method you will use for analysis.

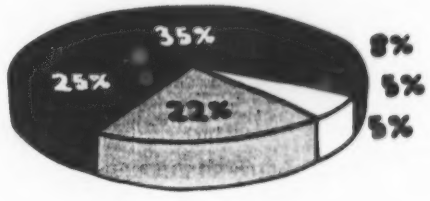
Data analysis includes several tasks:

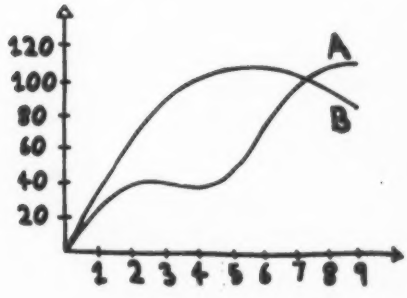
- Summarize the data by counting questionnaire responses or observations and looking for common characteristics and trends. Some of the most common **descriptive statistics** that you can calculate are frequency, mean, median, mode, range, and percentage.
  Frequency: The number of times that something is repeated at specific intervals
  Mean: The average, calculated by dividing the sum of a set of observations by the total number of observations in the set
  Median: The middle value, from a set of observations that has been ranked
  Mode: The value that occurs most frequently in a set of ungrouped data values
  Range: The difference between the lowest and highest numbers in a group
  Percent: A part of something in relation to its whole (usually 100%)

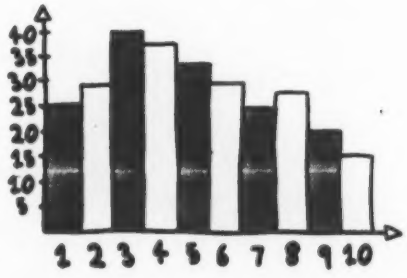
  For analysis of qualitative data, you can group data into categories of similar responses and review data by category to determine patterns. Alternatively, you can turn data into numbers by counting the occurrence of statements and observations and assigning a numerical value to the responses.
  (Larson and Svendsen 1996, 53-54.)

- Organize the data in a clear manner using graphs, charts and tables. This can be done by hand or using a computer (various chart and graph software is available). Arranging your evaluation information in graph or chart form will make trends in the data or differences between sample sets easier to recognize and interpret.
- Compare data sets to find out if there are significant differences among them. These **inferential statistics** indicate the probability,

GROUP	OBJECTIVE NUMBER						
	1	2	3	4	5	6	7
VILLAGE A	91	76	33	13	7	56	2







or likelihood, that differences among data sets and samples can be attributed to the impact of your program rather than simply to chance.

- Interpret the data to explain why things are the way they are. What do the descriptive and inferential data mean?

Margoluis and Salafsky (1998, 180-201) include a good discussion of various statistical analyses – from simple to more complex – for comparing and interpreting data. They suggest beginning with basic analyses – many of which are quite useful, and avoid trying to use more advanced methods of analysis if you do not fully understand them.

5. Communicate the Evaluation Results and Act on Them

It is very important to communicate the results of your evaluation. Communication of results should not be simply reporting; rather it should include interpretation of the results and their significance so that they can be understood and applied. Be sure to include conclusions and recommendations for action and change, summarizing the strengths and weaknesses of the program or activity.

Make a connection between the audiences you have identified for the evaluation *(see page 156)*, the evaluation methods used, and the way in which you will communicate results and act on them. For example, detailed results of an exhibit evaluation should be provided to the exhibit designer. Ideally, the designer would also be involved in the development of the evaluation process. A school outreach educator who provided topic suggestions, but did not design the exhibit, may want general information about appropriateness of information presented in the exhibit and when revisions to the exhibit will be scheduled.

Sensitive results should be shared appropriately – between a supervisor and an employee, for instance. However, if the performance of several educators is evaluated, a general report of their performance as a group, which does not highlight any one individual, may be distributed more broadly.

Confidentiality of evaluation respondents must be respected. People surveyed or interviewed should be assured that their identities will not be revealed in reports. In this way, evaluation serves to better understand a program's effectiveness, not to pass judgment on the behavior of participants.

There are numerous ways to communicate the results of your evaluation. Select a method that will work to convey information to a specific audience that you want to reach. Where possible show evaluation results visually using graphs, tables, pie-charts, and diagrams. Such techniques are applicable for both quantitative and qualitative data. They help to illustrate and interpret statistical trends, and to highlight differences between sample sets.

Communication methods you can consider include:

- **Oral presentations**
  This can be an effective way to describe and discuss your findings in a public forum or with a particular group of people (e.g., other staff, donors, community members, policy makers) using visual aids such as handouts, slides, posters, or charts. Discussion with the people in attendance is an important part of this presentation format.
- **Informal contacts**
  Through conversations with individuals, you can share the results of your evaluation. This is particularly important as a follow-up with key informants or others who work with you closely.
- **Reports**
  Written documentation of your findings, in draft or published form, can be distributed to a literate audience, in particular those who wish to receive in-depth information and/or want to have a record of the work you have done (often donors).
- **Press releases**
  For newsworthy findings, the media is a useful way to reach the public. Getting your results on radio, television, or in the newspaper can also be effective in reaching policy makers (*see page 122*).
- **Brochures and pamphlets**
  To highlight findings for wide distribution, you could develop and distribute brochures or pamphlets.

- **Internet and the World Wide Web**
  If you have access to the Internet, you can reach an international audience inexpensively with information derived from your evaluation. Information can be communicated using E-mail, or by publishing evaluation data, results, or reports on an Internet site (either your own site, if you have one, or that of a partner organization). The Internet is a useful and efficient way to build up a network of contacts and share information with people working in situations similar to yours.

Acting on your results is essential. Otherwise you will have expended a lot of effort, and possibly learned a lot in the process, but your program will not benefit. It may seem overwhelming to incorporate changes that are suggested by evaluation results. However, if you prioritize the information, you can implement changes incrementally (in steps or phases). When these changes are sufficiently incorporated into your program, you are ready to move on to another item for improvement. By continually making small changes to improve your program, you are better able to address changing conditions – environmental issues, economic conditions, and community needs and expectations – under which your interpretive program exists.

Consider how well the evaluation process worked and modify it to better meet your needs. As you work to apply the findings of your evaluation, ask yourself if the evaluation has served the purpose you intended. Did you get the type of information you wanted? Are you able to use the information the way you wanted? Was the method you used cost-effective? What changes could you make to design a better evaluation? Ask outside experts to review your process. The people to whom you have reported your information, especially your peers and professional organizations, may be able to show you what has worked for them. Reflect on these suggestions in order to improve the next evaluation you do!

Appendix 5 Resources for Evaluations

It may be useful to look at a few sources to identify an evaluation approach or combination of methods that you are most comfortable with and best meet your needs.

Braus, Judy A., and David Wood. 1994. *Environmental Education in the Schools: Creating a Program that Works!* Troy, Ohio: North American Association for Environmental Education.
Describes a variety of formal and informal strategies for evaluating environmental education activities (pages 439-460).

Fox, Helen. 1989. *Nonformal Education Manual.* Washington, DC: Peace Corps Information Collection and Exchange.
Evaluating nonformal education programs; includes participatory evaluation methods.

Jacobson, Susan K., ed. 1995. *Conserving Wildlife: International Education and Communication Approaches.* New York: Columbia University Press.
Case studies provide examples of wildlife conservation projects that use nonformal education approaches, illustrating effective design and implementation of educational programs, systematic collection of data, continual evaluation, feedback from participants, as well as identifying secondary and unexpected results.

Knudson, Douglas M., Ted T. Cable, and Larry Beck. 1995. *Interpretation of Cultural and Natural Resources.* State College, Pennsylvania: Venture Publishing, Inc.
Has a chapter on evaluation, including individual performance evaluation, evaluation of an overall program and its component activities, and visitor reactions.

Larson, Patricia, and Dian Seslar Svendsen. 1996. *Participatory Monitoring and Evaluation: A Practical Guide to Successful ICDPs.* Social Science and Economics Program. Washington, DC: World Wildlife Fund.
A guide to monitoring and evaluation designed for project staff, providing an overview and examples of a participatory approach to monitoring and evaluation, and workshop activities for building skills for evaluation.

Margoluis, Richard, and Nick Salafsky. 1998. *Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.* Washington, DC: Island Press.
A thorough, illustrated guide to evaluating community conservation projects. Four project scenarios are used to explain the evaluation process. Includes an introduction to statistical analysis.

Regnier, Kathleen, Michael Gross, and Ron Zimmerman. 1994. *The Interpreter's Guidebook: Techniques for Programs and Presentations.* 3rd ed. Interpreter's Handbook Series. Stevens Point, Wisconsin: UW-SP Foundation Press, Inc.
Includes self-evaluation, mentor evaluation, and visitor evaluation of interpretive presentations.

Stone, Ralph. 1997. *What's Your Role? Training for Organisational Impact. A Guide for Training Officers in Protected Area Management.* African Biodiversity Series, No. 5. Washington, DC: Biodiversity Support Program.
This guide for developing a training program plan discusses information collection methods for needs assessment, monitoring, and evaluation.

Serrell, Beverly. 1996. *Exhibit Labels: An Interpretive Approach.* Walnut Creek, California: AltaMira Press.
Sections on evaluation during exhibition development and after exhibition opening.

Taylor, Samuel, ed. 1991. *Try It! Improving Exhibits through Formative Evaluation.*
Washington, DC: Association of Science-Technology Centers.
1025 Vermont Avenue, NW, Suite 500, Washington DC 20005-3516, USA.
Tel: +1 202 783 7200 Fax: +1 202 783 7207

Wood, David S., and Diane Walton Wood. 1988. *Conservation Education: A Planning Guide.* Washington, DC: Peace Corps Information Collection Exchange.
Brief discussion of why evaluation is important and some of the key questions to ask in evaluating conservation education activities (pages 105-111).

WEEA Evaluation Assistance Project. 1989. *Evaluation Management Handbook.* Andover, Massachusetts: The Network, Inc.
The Network, Inc., 290 South Main Street, Andover, Massachusetts, MA 01810, USA.
An excellent evaluation guide defining program evaluation and detailing the basic steps in conducting an evaluation (using a study of educational equity for Hispanic adolescents in the Northeastern U.S. as an example).

Key Terms

Baseline information: The facts (data) recorded at a particular point in time. These facts can later be compared with new information to assess any change from the original condition.

Biodiversity: The variety and interdependence of life in all of its forms.

Biome: A major regional ecological community characterized by dominant forms of plant-life and prevailing climate.

Cross check: To use more than one method of collecting information and to compare the results of these methods.

Data: Factual information.

Diorama: A three-dimensional scene in which figures are arranged naturalistically against a background.

Ecotourism: Responsible travel to natural areas to understand the natural and cultural history, while maintaining the integrity of the environment and providing benefit to local people.

Environment: Includes all of the living and non-living things that surround, interact with, and influence us.

Evaluation: The process of making a judgment about the worth of something. This judgment is based on evidence collected to determine if certain objectives have been met.

Exhibition: A display of graphics or objects assembled to convey a message to viewers.

Formative evaluation: The process of measuring progress by evaluating during program implementation.

Goal: A broad statement summarizing what you would like to accomplish.

Message: An idea or concept to be conveyed to an audience.

Mock-up: A model or a drawing that is generally made to scale, in preparation for making a final product.

Needs assessment: The process of identifying gaps between the actual and desired environmental knowledge, awareness and behavior of prospective audience(s) and determining ways that education can address these gaps.

Objective: A statement that describes one aspect of how a goal is to be accomplished.

Participation: The involvement of people in a program or activity. There are different degrees of participation, with the greatest being the active engagement of people in needs assessment, program development, implementation, and evaluation. In short, full participation is the involvement of people in a process through which they gather information, receive education or training, and then apply what is learned.

Presentation: An interpretive activity that is guided by an educator.

Qualitative data: Data that express qualities such as opinions, feelings, observations, and behavior changes.

Quantitative data: Data that are represented by numbers and can be manipulated statistically. These data include tabulations of frequency, percentages, means and averages.

Role-play: A participatory form of dramatic performance, in which individuals take on various roles for the purpose of discussion.

Stakeholder: Someone who has an interest, or stake, in the implementation and/or outcome of a situation.

Summative evaluation: The process of evaluating after a program or activity is completed to measure the end result.

Target audience: A definable group of people at whom a message, information, education or training is aimed. The group may have a particular effect on a problem; through education, these people have the potential to help solve the problem.

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The Center for Biodiversity and Conservation at the American Museum of Natural History is dedicated to the study and conservation of biological diversity, defined as the variety of life in all its forms and the interactions among these living forms and their environment. Drawing on the strengths of the Museum's scientific, exhibition, and education departments, the Center strives to integrate scientific information into the conservation process and make it available to local, national, and international audiences.

181

ISBN 1-930465-04-1